Healthy@Work? Lifestyle factors and workplace health promotion

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Declaration of originality

This thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by any other person except where due acknowledgement is made in the text of the thesis, nor does the thesis contain any material that infringes copyright.

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Abstract

Adverse lifestyle factors, such as cigarette smoking, poor diet, risky alcohol consumption, overweight and obesity, physical inactivity and sedentary behaviours, are associated with non-communicable diseases and premature mortality. Evidence from controlled interventions shows that workplaces are settings where employee lifestyle factors can be improved via workplace health promotion (WHP). Less clear is what happens outside of controlled trials, when organisations attempt to implement WHP underpinned by best-evidence principles. In 2009 the Tasmanian State Service invested in a four-year WHP program that targeted its entire workforce. The aims of this thesis were to investigate employee participation in, and the benefits of, the Healthy@Work project. Of particular focus were employee lifestyle factors, including sedentary behaviours, and recommended WHP implementation strategies in practice.

The study used a repeated cross-sectional survey design with stratified random samples. Survey data was collected in 2010 (n=3408) and 2013 (n=3228) from Tasmanian State Service employees, and respondent characteristics were similar in both surveys. With regard to implementation, the findings indicated employee needs assessments and health risks are likely to align with employee preferences for programs. Inequitable access to WHP activities, and lower levels of participation in some at risk groups, was evident. Barriers to participation included time, health problems and location of activities. However, recommended implementation practices, and social support, were related to participation in more activities. For lifestyle factors, prolonged sitting at work was found to be associated with psychological distress. Finally, participation in activities related to health behaviours was associated with a range of employee-perceived benefits, such as being motivated or assisted to be physically active, yet population-level differences in lifestyle factors were not observed between 2010 and 2013. Despite observed intermediary benefits, Healthy@Work was either ineffective in regard to achieving measurable behaviour change, or insufficient time had elapsed to detect a population-level shift. Organisations administering WHP should establish clearly

defined outcomes and appropriately match expectations, resources and time frames to realising those outcomes.

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(ouch) to showing off my latest op-shop finds (I can't think of anyone who has been spared that experience), I am grateful for a workplace where I can be my daggy self.

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Statement of authorship

This thesis includes papers for which Michelle Kilpatrick (MK) was not the sole author. MK conceptualised the papers, analysed the data and wrote the manuscripts. The following people and institutions contributed to the publication of work undertaken as part of this thesis:

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The contribution of each author:

MK conceptualised the paper, conducted the data analysis, contributed to the interpretation of the data and wrote the manuscript.

AV assisted in conceptualising the paper, assisted with analyses and interpretation of the results and revision of the manuscript.

LB advised on data analysis and interpretation, and revised the manuscript.

KS helped with interpretation of the results and revised the manuscript.

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Publications

Publications arising directly from the work described in this thesis:

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Chapter 4

Kilpatrick, M., Sanderson, K., Blizzard, L., Teale, B., & Venn, A. (2013). Cross-sectional associations between sitting at work and psychological distress: Reducing sitting time may benefit mental health. Mental Health and Physical Activity, 6(2), 103-109.

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National

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4. Kilpatrick, M*, Sanderson, K, Blizzard, L, Venn, A. Occupational sitting and psychological distress in public sector employees. Population Health Congress. Oral presentation. Adelaide, September 2012.

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Chapter 1

Introduction

Chapter 1. Introduction

1.1 Preface

This thesis presents research undertaken as part of a larger research project, *partnering*Healthy@Work (*p*H@W), which was established to help evaluate the health and economic outcomes of a workplace health promotion initiative implemented by the Tasmanian State Government (Healthy@Work, 2009-2012). *p*H@W was a five-year partnership between researchers at the Menzies Institute for Medical Research, the University of Tasmania, and key staff from the Tasmanian State Service. *p*H@W was an inaugural recipient of project funding from the Partnership for Better Health Grants, a scheme run by the National Health and Medical Research Council, Australia's peak medical and health funding agency. The purpose of the partnership was not to be involved in the design or implementation of Healthy@Work. Rather, the partnership exploited a unique opportunity to observe the process and outcomes of a natural experiment: what happens when an organisation like the Tasmanian State Government devises and implements WHP for its own employees, using a comprehensive approach that combines setting-based and individual behaviour change activities? Researchers from the partnership conducted investigations around a number of different aspects of Healthy@Work including mental health promotion, economic evaluation, a process evaluation of Healthy@Work, and an evaluation of the partnership. The research presented in this thesis focused on implementation practices, and lifestyle factors (employee health-related behaviours, and overweight and obesity).

This introductory chapter describes adverse lifestyle factors and associated health consequences, efforts to address adverse health-related behaviours through health promotion and workplace health promotion, and implementation of workplace health promotion programs. It describes Healthy@Work and the key theoretical and implementation principles underpinning its development and implementation, the role of the partnership in evaluating Healthy@Work outcomes, and the specific objectives of this thesis.

1.2 Lifestyle factors, non-communicable disease and mortality

1.2.1 Smoking, nutrition, alcohol consumption and physical activity

Adverse lifestyle factors, such as cigarette smoking, physical inactivity, sedentariness, poor diet, risky alcohol consumption, and overweight and obesity, contribute considerably to the global burden of disease (1), and are associated with the development of numerous non-communicable diseases (2, 3) and an increased risk of premature mortality (4-6). Six percent of global deaths are attributed to physical inactivity, 9% to tobacco use and exposure, 4% to harmful use of alcohol, 3% to low fruit and vegetable consumption, and 5% to overweight and obesity (7). In developed countries, smoking is estimated to cause 22% of cardio vascular disease (CVD), and over 70% and 90% of lung cancers in women and men, respectively. Between 56% and 86% of chronic respiratory diseases have been attributed to tobacco use. Globally, low fruit and vegetable intake is estimated to account for 31% of ischemic heart disease, 19% of gastrointestinal cancers and 11% of stroke incidence. Moreover, physical inactivity, defined by the World Health Organisation as a failure to participate in at least 30 minutes of moderate intensity physical activity, or equivalent, on most days of the week (8) has been shown to contribute to the development of common cancers, Type 2 diabetes, and 22% of ischemic heart disease (7-9).

1.2.2 Sedentary behaviour

Sedentariness was long considered synonymous with inactivity. As such, an individual was labelled ‘sedentary’ if they did not meet the minimum levels of physical activity per week recommended to promote health. A distinction between sedentariness and physical inactivity is now well established (10), and sedentary activities are currently defined as any waking behaviour that results in little or very low energy expenditure, and that involve sitting or reclining (11).

Sedentary behaviour has been found to be an independent behavioural risk factor associated with poor physical and mental health outcomes, independent of the amount of physical activity people participate in during their leisure time (12). Though critical to good health, physical activity appears unable to compensate for the adverse health effects of prolonged, unbroken periods of time spent in

sedentary activities (13). Estimates of time spent sitting have been associated with an increased risk of CVD (14), Type 2 diabetes (3, 15), overweight and obesity (16, 17), depression (18), mental wellbeing (19) and prospectively linked to all-cause and CVD-related mortality (20-24), independent of physical activity levels. After adjustment for physical activity, it has been estimated that total daily sitting time accounts for 6% of all-cause premature mortality (24).

Sitting is ubiquitous across many domains of daily activities (25, 26) including transport, leisure-time recreation and at work. In particular, changes to office-based work due to computer use and email have meant a reduction in opportunities for intermittent standing and incidental activity (27). Objective measurement of employed adults' activity has shown workers, on average, spend nine hours on a weekday in sedentary behaviour, with approximately half of this sedentary time accumulated at work, characteristically in lengthy, unbroken sitting 'events' (3, 28, 29). Much of the extant sedentary behaviour research, however, has focused on estimates of sitting in leisure time, or total time sitting. It is widely acknowledged that further research is required to understand the independent risks associated with occupational sitting to help safeguard worker health for those exposed to prolonged occupational sitting (26, 30-32). For example, despite emerging evidence linking poor physical health outcomes and prolonged occupational sitting (32), very little is known about sedentary behaviours and mental health in the work domain.

1.2.3 Overweight and obesity

Physical inactivity, sedentariness and high-energy dietary intake are fundamental contributors to energy imbalance, and thus overweight and obesity are intermediate risk factors for non-communicable disease (16). Overweight and obesity are estimated to account for 4% of global burden of disease (33), and are associated with the risk of developing Type 2 diabetes and CVD (7, 34). CVD and Type 2 diabetes themselves are burdensome on individuals and society. CVD is the leading cause of death globally, and contributes 12% to the total burden for disease, while Type 2 diabetes accounts for 2% (7).

1.2.4 Prevalence and clustering of lifestyle factors

In Australia (see Figure 1.1 below) and globally, adverse lifestyle factors are prevalent, so too the associated cardiovascular diseases, cancers, and Type 2 diabetes (7, 35, 36). Many of these non-communicable conditions are seen as largely preventable if lifestyle factors are improved (37). Moreover, a tendency exists for adverse lifestyle factors to co-occur or cluster (38-41). Individuals with multiple risk-related lifestyle factors are at heightened risk of morbidity and premature mortality related to chronic disease (5, 38) and mental illness (42). Conversely, maintenance of multiple healthy lifestyle factors has been prospectively associated with decreased risk of all-cause mortality (4, 43). Population-based health promotion strategies are advocated to complement or prompt efforts made by the individual to modify their health-related lifestyle choices (44).

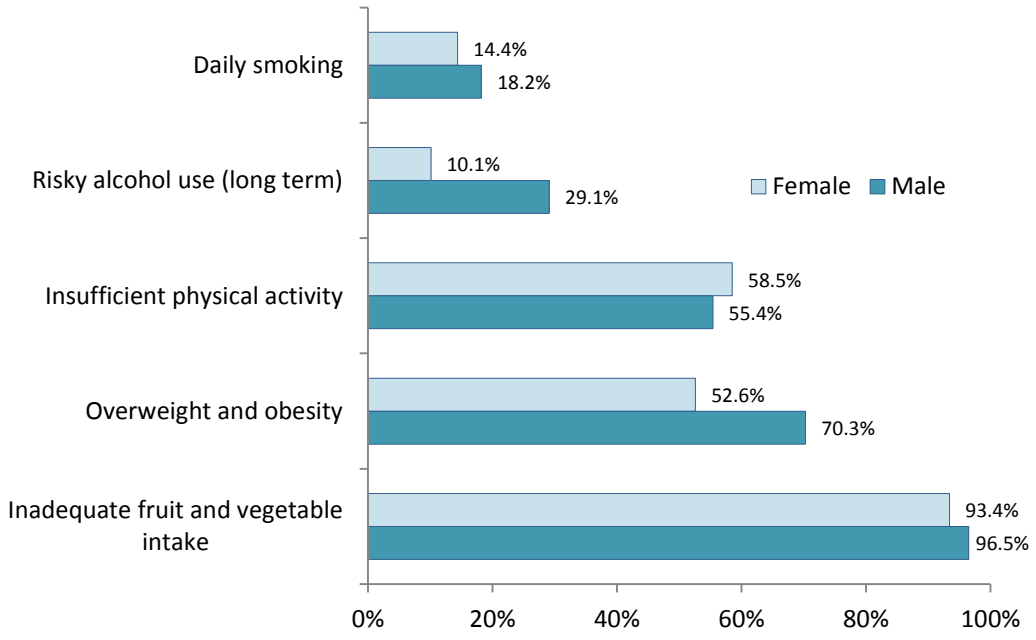

Figure 1.1 Prevalence of lifestyle factors in Australians aged over 18 years, by sex, 2011-2012. Source: Australian Bureau of Statistics, 2013.

1.3 Workplace health promotion

1.3.1 Health promotion

The World Health Organisation defines health promotion as “the process of enabling people to increase control over their health and its determinants, and thereby improve their health” (45). The definition encompasses the promotion of general wellbeing, including physical and mental health, as well as the absence of ill health (46). Comprehensive health promotion aims to address the social, environmental, economic and where possible, political influences on public and individual health, in addition to building the capacity of individuals to better manage their own health (47). Strategies can incorporate population approaches designed to control or remove determinants of impaired health in the population as a whole, or target individuals known to be susceptible to poor health or particular health conditions (48, 49).

1.3.2 Health promotion in a workplace setting

Workplaces have been identified as viable settings for health promotion that may help to combat the rising prevalence of CVD, Type 2 diabetes, and other non-communicable diseases (50-52). Employment and working conditions themselves can be important determinants of physical and mental health (17, 53-55). Workplace health promotion (WHP) programs are typically employer-driven initiatives that aim to identify and address the health and wellbeing needs of employees (56). Drawing upon broader health promotion principles, WHP typically involves the coordinated application of strategies focussed on ill-health prevention, and health promotion (57). Advantages of the workplace setting for health promotion include having long-term access to a large proportion of the adult population, most of whom spend considerable proportions of their waking time at work. Workplace-based initiatives also afford the opportunity to exploit existing organisational infrastructure, communication and social support channels (55, 56).

1.4 Workplace health promotion implementation

Comprehensive population-based programs are increasingly recommended for workplace health promotion (56, 57). A comprehensive approach to WHP integrates organisational- and employee-level strategies that structure physical, social, procedural and policy-related workplace environments to make them more conducive to healthy lifestyle choices, as well as providing health-promoting activities and supports to employees (58). In addition, workplaces are increasingly encouraged to integrate WHP with occupational health and safety (59).

Comprehensive WHP has developed to encompass a variety of health promoting approaches represented by the term 'workplace health promotion'. The two predominant health-promoting strategies are settings-based changes to the work environment at an organisational level, and individual-focused activities that target employees directly to encourage improvements to health-related behaviours (60). The Jakarta Declaration in 1997 highlighted the settings approach as a key driver to successful health promotion, with the workplace a priority setting (61). This was further supported by the WHO's Global Healthy Work Approach that advocated for the development of a comprehensive approach to WHP (62) that in effect combines elements of the two strategies, with a stronger emphasis on the settings approach. The European Network Workplace Health (ENWHP) Promotion initiative (63) and the WHO Healthy Workplace Framework and Model (64) also champion the comprehensive approach. The ENWHP developed a 'toolbox' for organisations to use as a practical kit for action to improve the health and wellbeing of employees. The toolbox includes models of good practice, example questionnaires for needs assessment or evaluation, information materials, and had a focus on lifestyle issues (nutrition, exercise, smoking, alcohol, mental health and stress) (63).

Historically, workplace health promotion programs have been set apart in practice from mandated occupational health and safety procedures that protect employees from injury or illness while they are at work (65). While differences exist between the two undertakings in regard to the overall objectives, voluntary nature of participation, and legislative requirements, a growing body of evidence suggests they can be complementary when integrated into an overarching workplace health

protection and promotion framework (66-68). The Centre for Disease Control recommends a focus on total worker health through the alignment of work health protection and promotion, as each factor is posited to synergistically enhance the outcomes of the other: healthier workers are more likely to be safer workers, and safer workers more likely to be healthy (65, 69).

A number of other process and implementation components considered integral to quality comprehensive WHP have been outlined by Terry and colleagues (70). In a review of literature, the authors reported links between these components and enhanced employee engagement with the programs and health outcomes. The components included: senior- and middle-management support, demonstrated by health-focused communications, policies and changes to infrastructure; strategic use of a variety of tailored communications; health awareness programs; dedicated staff responsible for program coordination and implementation; multiple activity types and delivery methods, such as programs that target multiple health concerns using face-to-face-, telephone- or web-based modalities; and a consultative approach to activity choice and design.

Employee consultation is an implementation strategy proposed to empower employees in WHP decision-making and increase engagement with programs (71). Using this method, WHP facilitators can gauge the lifestyle factors employees want and are motivated to address, tailoring programs accordingly (55, 72). For example, a study of health risks, health behaviours and behaviour change priorities for blue-collar women concluded that aligning programs with employee health priorities increased the likelihood of health behaviour change (73). Employee health risk assessments are similarly used to determine employee health needs (74), however inconsistencies between results obtained from health risk assessments and an employee consultation process would pose a challenge to WHP facilitators. Should programs be targeted to the observed or stated need? Despite the implications for appropriate allocation of resources and WHP design, research that investigates whether employee nominated health priorities are relevant to their health risks is scarce.

1.4.1 WHP activities that address adverse lifestyle factors

Workplace health promotion activities that focus on individual risk factors and behaviour change are generally defined as primary or secondary interventions. Primary intervention refers to health promotion efforts directed at a general employee population, most of whom will be in good health. Secondary intervention targets employees already considered to be at higher risk, for example smokers or highly sedentary employees (75). Activity types can vary widely (55), from providing health information, screening, and risk appraisals to activities focussed on aiding smoking cessation (76), healthier eating (77), reducing harmful alcohol consumption (78), increasing physical activity (79), and sedentary behaviour interventions (80). Evaluations of WHP activity interventions and lifestyle factor change have demonstrated modest efficacy (81), with small to moderate improvements for diet (82-85), weight (86, 87), physical activity (88), smoking cessation (76, 89), and a reduced likelihood of chronic disease incidence (90).

There is marked heterogeneity in the interventions and populations assessed in the literature that can make comparisons and evidence synthesis a challenge. A meta-analysis of the effectiveness of primary preventive WHP interventions, evaluated by randomised-controlled trials (RCTs), reported a small overall effect size (effect size = 0.24) for programs aimed at lifestyle factors (91). The authors noted larger effect sizes for interventions conducted in younger or primarily white-collar populations. Unsurprisingly, smaller effects were found for interventions where the control group received some minimal intervention. Activities can be offered as stand-alone or multi-component programs (92), however an overview of systematic reviews and meta-analyses investigating WHP intervention efficacy showed multi-component interventions to be the most effective for increasing physical activity and improving weight management (93). Limited evidence supports environmental and policy changes alone resulting in employees changing their lifestyle behaviours, with the exception of dietary behaviours (94, 95).

A consideration when reviewing the evidence for WHP programs and activities is that much of the existing WHP literature emanates from the United States of America. There, as a result of employee healthcare provisions incumbent on many

employers, organisational motivations to implement WHP, and the programs and activity incentives (96) that can affect employee participation, can be quite distinct from WHP offered in countries with universal health care (57, 97). There has also been a call for pragmatic 'real-world' research to complement and extend evidence derived from controlled trials (98-101). In a review of health and wellbeing programs in Canada, Després and co-authors (102) advocate for multi-site translational community trials and natural experiments to ascertain the effectiveness of comprehensive WHP when it is implemented outside of trial settings. Essentially, they are articulating the need for further exploration of WHP implementation and outcomes when organisations attempt to carry out WHP using the best evidence available.

In addition, WHP literature largely focuses on the measurement of risk factors, health-related behaviours or weight change as the outcomes of interest. These outcomes are of primary importance for programs that aim to improve employee health and wellbeing. Goetzel and co-authors (57) estimate, however, that at least three years of well-implemented and effective WHP is likely needed before population-level lifestyle factor change may be measurable. Therefore interim outcomes, such as employee self-reports of health benefits following participation in WHP activities, can represent meaningful outcomes on the pathway to improved health. Moreover, organisations may value provisional signals of program usefulness when a WHP program timeline spans a number of years (71). Very few studies have reported on these intermediary outcomes, including increased employee motivation to address, or assistance to address, lifestyle factors, and participation in large-scale comprehensive interventions outside of the United States.

1.5 Employee engagement with workplace health promotion

Successful workplace health promotion requires engagement by the organisation, individual worksites, managers, and employees (103, 104). Employee engagement with WHP, particularly workers most at risk of poor health, is key to optimising activity and health outcomes (150). WHP initiatives informed by an understanding of the workforce health profile, the perceived relevance and acceptability of programs by employees, and barriers to involvement can enhance participation (106-108).

Furthermore, research in the broader behaviour change literature has demonstrated that readiness to improve a health-related behaviour is an important determinant of whether an individual avails themselves of resources or programs to support that change (109-111).

It has proven challenging, however, to effectively address lifestyle factors within employee sub-groups at highest risk. Participation rates can be low in general (103) and there is a propensity for predominantly healthier, lower-risk employees to engage (112, 113). For example, Jonsdottir and colleagues (114) found that individuals who were physically inactive were less likely to engage with physical activity WHP initiatives. Also, it can be difficult to compare and contrast across participation studies, since methods vary in the way that participation is measured and reported. Participation can alternately refer to initial enrolment, attendance once only, sustained attendance or completed programs (115). Where participation is reported, it typically refers to participation in one or a limited number of activities. Literature that explores engagement with activities within broad comprehensive programs that target multiple health behaviours is limited.

1.6 Barriers and facilitators to participation

Knowledge of the individual, environmental and social factors associated with employee participation in WHP activities can help organisations to better manage equitable program implementation. Common identified barriers to participation include cost, lack of interest, motivation, time, unfavourable work schedules, and inconvenient location of activities (108, 116). Previous reviews have suggested that facilitators to employee participation include offering relevant activities and incentives (117), and multi-faceted programs designed to appeal to a broader population with differing needs (86, 118). Manager and co-worker support (119, 120), organisational support for healthy lifestyle choices (health climate)(105) and personal intention to change lifestyle behaviours have also been shown to facilitate employee participation (121). However, a limited number of studies have investigated the extent to which these barriers and facilitators influence participation in WHP activities for comprehensive programs implemented in large and diverse, multi-site settings (121).

1.7 Evaluating workplace health promotion

In summary, it is possible to conceptualise the various desired outcomes of WHP along a pathway, with the most proximal outcomes being organisational commitment to provide WHP and the most distal being disease status change or prevention (Figure 1.2 below). Behaviour change is the most commonly measured outcome, in part because studies are typically short- to medium-term and have finite resources to track participant health outcomes longer term. The hope in this approach is that continued optimised behaviour will positively affect more distal future health outcomes. However, the multifarious influences on health and behaviours beyond program participation are often too great to clearly tie health outcomes to participation in programs. Intermediary outcomes such as program engagement, self-reported benefits and shifts in employee motivation to better manage health and wellbeing concerns can be more straight forward to measure, and may be sufficiently valued by organisations and employees to be standalone program outcomes. Self-reported benefits may also represent an early signal of program effectiveness prior to measurable behaviour change. Despite this, these intermediary outcomes are not often studied or published.

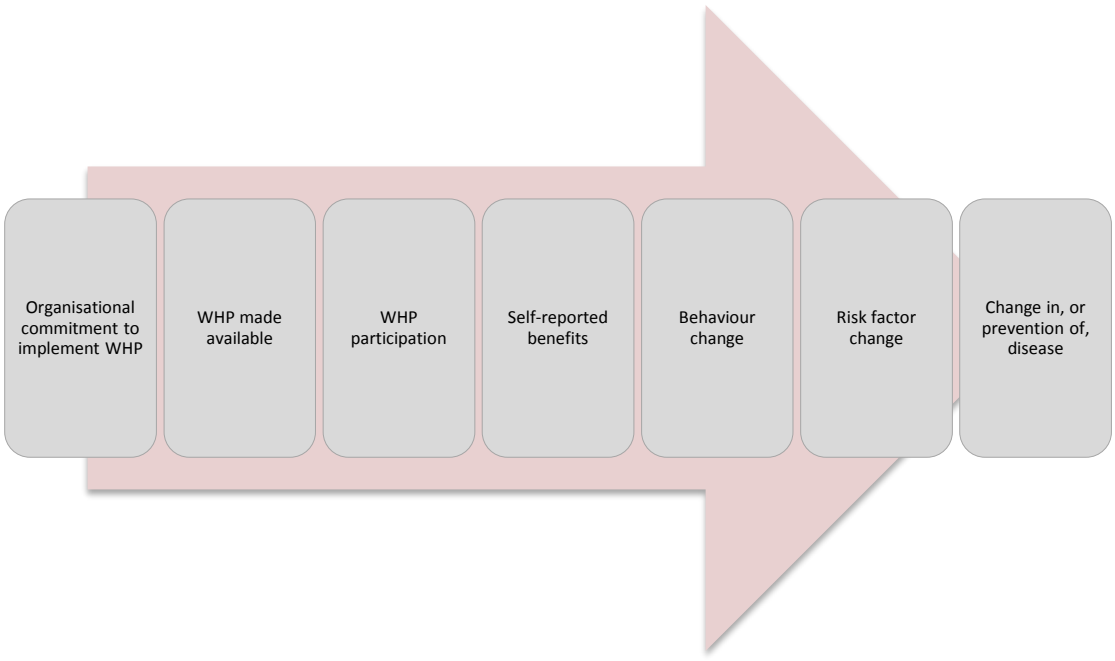

Figure 1.2 Evaluating outcomes of workplace health promotion

1.8 Summary of gaps in WHP evidence

In summary, sedentary behaviours occurring as a result of occupational demands require further investigation. With regard to WHP, the extant literature predominantly comes from the US. It remains unclear what the activity availability, participation, intermediary and employee health outcomes are when a large and diverse organisation implements WHP underpinned by best-evidence recommendations. Alternative approaches to evidence-based public health evaluation - for example, natural experiments - need to be explored to supplement available evidence, to guide the work of organisations and workplace health promotion practitioners.

1.9 Healthy@Work

Healthy@Work presented a rare opportunity observe and assist in the evaluation of one such natural experiment. Healthy@Work was a comprehensive WHP program devised and implemented by the Tasmanian State Service (TSS) between 2009 and 2013. One of the six states in Australia, Tasmania is the only island state, and is situated to the south of mainland Australia. The TSS employs approximately 30,000 employees in a diverse range of state government departments/agencies that has included: education; health and human services; justice, police and emergency management; treasury and finance; infrastructure, energy and resources (e.g. forestry); economic development, tourism and the arts; and primary industries, water and environment. Agencies and individual worksites are spread across metropolitan, rural and remote locations, and comprise many different occupations and job types (for example, blue and white collar, service, administration, managers, professionals).

Healthy@Work grew from an enduring commitment by the Tasmanian State Government to workplace health promotion. A pivotal Tasmanian State Government initiative that preceded Healthy@Work was a model for WHP included in the Premier's Physical Activity Council's resource Get Moving at Work: A Resource Kit for Workplace Health and Wellbeing Programs (122). Other key policy documents designed to direct health promotion in the state included Connecting Care: Chronic Disease Action Framework for Tasmania 2009-2013 (123), Working in Health

Promoting Ways: A Strategic Framework, the Tasmanian Physical Activity Plan 2005-2010 (124), and Building the Foundations for Mental Health and Wellbeing: A Strategic Framework and Action Plan for Implementing Promotion, Prevention, and Early Intervention (PPEI) Approaches in Tasmania (125), all of which influenced the commitment to Healthy@Work in the 2008/2009 Tasmanian State Budget.

The Tasmanian State Government solely funded Healthy@Work to promote the health of its own workforce. It is important to distinguish Healthy@Work from a national program targeting workplaces that was devised by the Australian Commonwealth Government at a similar time to Healthy@Work. The Coalition of Australian Governments (COAG) agreed to federal funding commitments for a National Partnership Agreement on Preventive Health that included a Healthy Workers Initiative in November 2008 (126). Available funding for the Healthy Workers Initiative commenced in 2011/2012 (127). The initiative was to support the development of private and public sector workplace health promotion in each state jurisdiction in Australia. There was an overlap in the implementation of the Tasmanian state-funded Healthy@Work program and the Tasmanian State Government devising its response to the commonwealth-funded Healthy Workers Initiative. Crucially, though, the programs were funded independently of one another.

Because of the Tasmanian State Government's prior experience with WHP, the resources and knowledge available to the Tasmanian government's response to the Healthy Workers Initiative were well advanced when Healthy Workers funding commenced in 2011 (127). As such, Healthy@Work resources and the Healthy@Work facilitator training sessions were accessed by other state jurisdictions for use in their own Healthy Workers programs. Beyond this sharing of resources from the Tasmanian State Government to other jurisdictions, Healthy@Work and the Healthy Workers Initiative were independently devised and funded programs.

In 2009, the TSS allocated $AU2.1 million over four years to support the implementation of Healthy@Work across its whole workforce. Each agency was obligated to develop its own WHP according to best-practice guidelines, following a

legislated directive to do so from the head of the State Government in 2009. Being a comprehensive WHP program, Healthy@Work was primarily an organisational-level intervention that also incorporated individual-level health promoting activities. The overall objectives were to improve the health and wellbeing of all employees, and increase the efficiency and productivity of the State Service. Healthy@Work was built around a framework that acknowledged the range of determinants that impact an employee's health, including work-related determinants (physical environment, organisational culture and structure, job-related demands) and determinants outside of the workplace (lifestyle behaviours, family-, social- and community-related factors) (Figure 1.3, below).

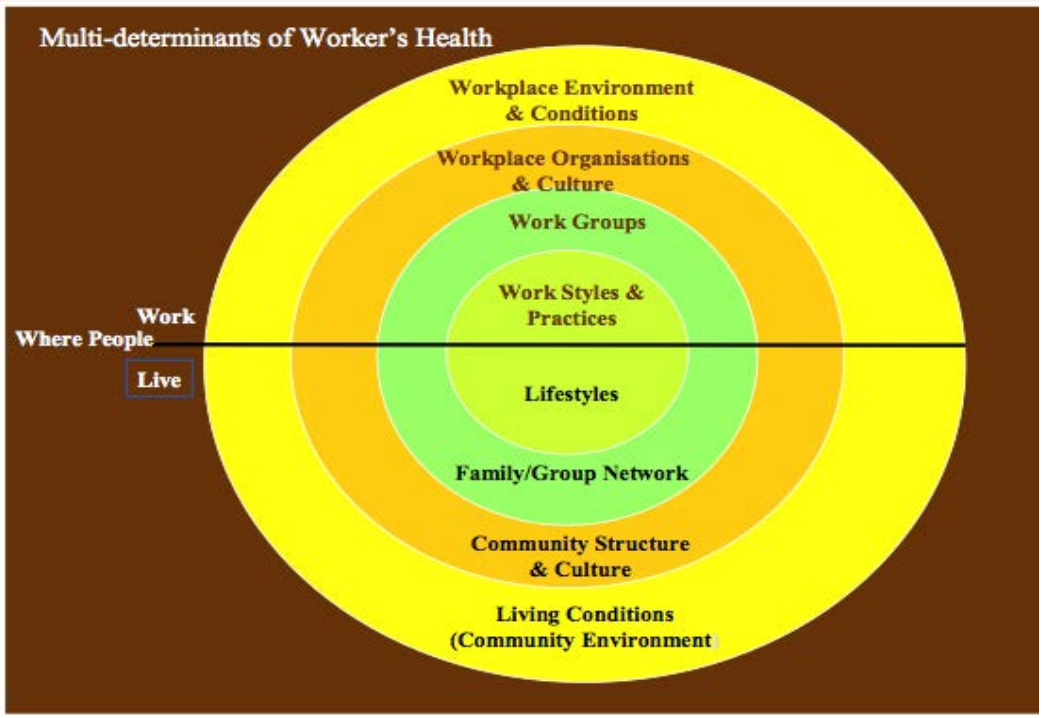

Figure 1.3 This schema from the World Health Organisation – Regional Office for the Western Pacific (1999) was provided in Healthy@Work guidelines to encourage agencies to consider the various determinants of health when designing and implementing WHP

An important element of the overarching strategic plan was to ensure equitable access to a broad array of activities that concentrated on smoking cessation, nutrition, alcohol consumption, physical activity, sedentariness and mental health (117). By training key department personnel and supporting each department to

apply an evidence-based implementation process, the ultimate goal was to embed within departments knowledge and programs that would persist beyond the initial funding period.

Healthy@Work implementation guidelines were provided to all agencies to help agencies integrate nationally and internationally recognised best-evidence components into their program design (57, 128). The guidelines set out a recommended implementation cycle, and provided detailed descriptions of each element of the cycle (Figure 1.4, below).

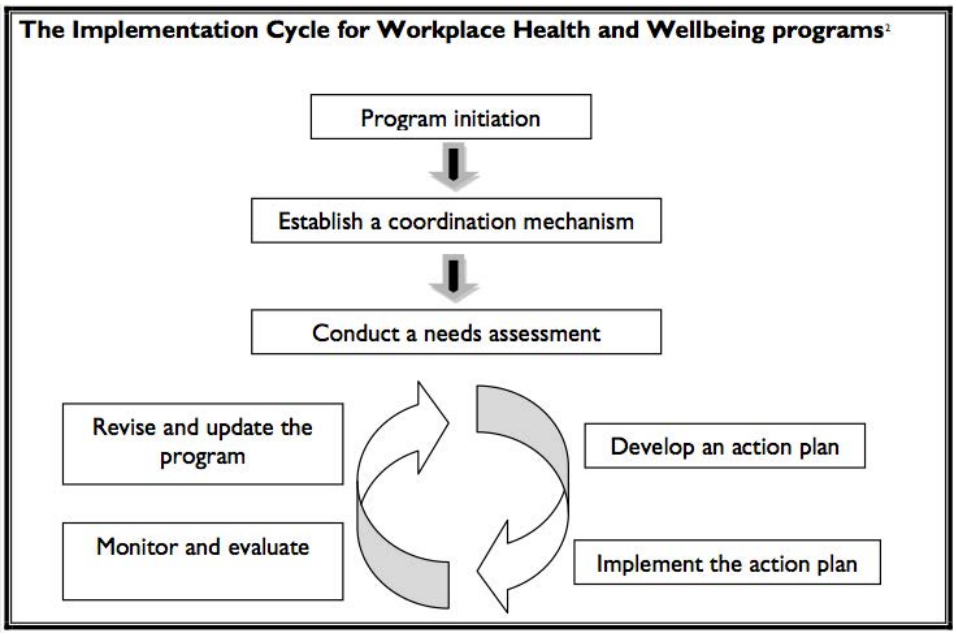

Figure 1.4 Recommended Healthy@Work implementation cycle for each Tasmanian State Service agency

1.10 Key implementation principles behind Healthy@Work

Agencies were instructed to apply a number of key principles that align with the quality components identified in the comprehensive WHP literature (70).

Agencies were advised that Healthy@Work programs were to:

- consider workplace structures, cultures and policies, including the economic, legislative and political environment with implementing WHP programs
- be sustainable through integration into organisational operations and policies, and be flexible and responsive to changing organisation and employee needs
- be managed within the workplace by staff that identified relevant issues and strategies to address them, drawing on the expertise of health professionals when necessary
- involve employees in planning programs, identifying needs and incentives to participation to enhance engagement with Healthy@Work activities
- include an assessment of needs to identify health issues in the workplace
- involve equitable access for staff, regardless of current health status or position within the organization
- involve an evaluation process
- be integrated into organisational operations
- use a variety of strategies to address individual, environmental and organisational issues
- involve voluntary participation, without prejudice to employees who chose not to participate
- include training in health promotion principles for key staff responsible for program coordination
- reinforce and support legislated occupational health and safety
- be cost effective

1.10.1 *partnering*Healthy@Work

Researchers from the Menzies Institute for Medical Research, University of Tasmania, and other faculties from the University of Tasmania, recognised that Healthy@Work provided a novel opportunity to help evaluate a comprehensive WHP program underpinned by best-evidence implementation components within an Australian setting. After receiving funding from a National Health and Medical Research partnership grant, the researchers and the Tasmanian State Service collaborated to form the *partnering*Healthy@Work (*p*H@W) project. The goal of *p*H@W was to investigate the process, economic and health outcomes of Healthy@Work to a level beyond what the TSS could achieve using its own resources and thus extend the policy and research implications. Three PhD students were recruited to the project, and each had a placement of approximately 100 hours within either the Department of Health and Human Services (DHHS) or the Department of Premier and Cabinet. The partnership and the placements where intended to foster greater understanding between researchers and policy makers; to assist researchers to become more cognisant of policy-making requirements, practical applications of research, and for policy-makers to appreciate and utilise sound research, all of which progresses the translation of research for evidence-based public health (129, 130). The placement work undertaken by this candidate for the DHHS is not included in this thesis.

The purpose of the partnership was not to design or implement Health@Work. It was established to observe the process and outcomes of Healthy@Work using research from a number of researchers on the project. Each piece of research done within the partnership was designed to contribute to the overall understanding of Healthy@Work implementation and outcomes, which was valuable to the TSS partners. In addition, each investigation was to address gaps in the WHP literature more broadly.

1.10.2 Areas of research within *partnering*Healthy@Work

Economic evaluation	Siyan Baxter, PhD candidate, focused on the economic case for WHP programs in general, then Healthy@Work specifically.
Mental health promotion	Lisa Jarman, PhD candidate, focused on mental health in the workplace, WHP that promotes mental health and reduces job stress, and stress-related workers compensation claims.
Lifestyle factors and WHP activity implementation and engagement	Work presented in this thesis.
Process evaluation	Dr Theresa Doherty and Dr Fiona Cocker, postdoctoral fellow on *p*H@W, conducted a process evaluation to track the development and delivery of Healthy@Work. They conducted semi-structured interviews with program coordinators from each TSS agency and other key informants. They reviewed documents, audits and reports that had been created and used throughout the development, administration and implementation of Healthy@Work.

1.11 Thesis aims and specific objectives

1.11.1 General aim

- Use an observational study to investigate employee participation in, and the benefits of, a comprehensive workplace health promotion (WHP) initiative, with a focus on lifestyle factors and implementation strategies.

1.11.2 Specific objectives

1.11.2.1 Occupational sitting

- To investigate the mental health risks associated with prolonged sitting at work, a bourgeoning health risk of interest nationally and internationally, and a key health focus area for Healthy@Work.

1.11.2.2 WHP implementation practices in a large and diverse setting

- To investigate whether employee needs assessments align with employee preferences for optimizing their health or preventing ill health.

- To investigate factors associated with the availability of, and participation in, workplace health promotion activities related to health behaviours.

- To investigate employee barriers and facilitators to participation in health-related activities.

1.11.2.3 Employee self-reported benefits from participation, employee organisational commitment, and employee lifestyle factors

- To investigate the employee self-reported benefits of participation in WHP activities.

- To investigate employee organisational commitment and participation in WHP activities.

- To investigate employee health-related behaviours, and overweight and obesity, in 2010 and 2013.

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Chapter 2

Methods

Chapter 2. Methods

2.1 Preface

The *partnering*Healthy@Work (*p*H@W) project was established to observe, somewhat opportunistically, a WHP program that was conceived, designed and implemented by the Tasmanian State Service (TSS). The research partners were not in a position to influence this process. The goal of the TSS program was to reach its entire workforce with an organisational-level, settings-based approach to promoting health through the workplace, with an additional aim to support employee health behaviour change through the provision of WHP activities. As a result, the TSS was interested in assessing shifts in the employee health profile as a whole. Hence, *p*H@W adopted a population approach to explore the implementation and varied outcomes of Healthy@Work."

*p*H@W collected data from a number of different sources. The primary sources of data were two surveys of Tasmanian State Service (TSS) employees conducted in 2010 and 2013 by pH@W researchers, using a repeated cross-sectional design. The *p*H@W survey data were merged with TSS human resources administrative data that were made available by TSS partner investigators. The TSS data were extracted in 2010 and in 2013 to correspond with the data collection periods of each of the *p*H@W surveys. Annual audit data, compiled by each TSS agency as part of yearly reporting requirements to track the agency's Healthy@Work implementation progress, were also provided to *p*H@W researchers.

2.2 Study design

Healthy@Work was a health promotion program designed by the TSS to be made available to its entire workforce; randomised assignment to intervention and control arms within the TSS population was not part of the design, and comparison with a control population was not an option for the pH@W evaluation because no equivalent population existed. Repeated cross-sectional designs (1-6) are used to assess differences in health factors following interventions based in the wider community (7-12) and settings such as schools (6, 13), one method from a number of non-experimental evaluation techniques used to estimate population-level health

factors and secular trends. Describing pH@W as a 'repeated cross-sectional design' distinguishes it from a pre-post design, even though the survey was only repeated once. The description pre-post design could potentially be misleading in the case of pH@W, as pre-post test design is a type of repeated measure design that can follow the same participants, measuring them before and after an intervention, with or without control groups. The repeated cross-sectional description provides a clearer indication that this was not a longitudinal study that aimed to follow the same employees over time. While repeated cross-sectional designs often repeat surveys multiple times, it is not inaccurate to name the design repeated cross-sectional with only one repeat.

Other techniques available for use in evaluating natural experiments like Healthy@Work include interrupted time-series (ITS) and difference-in-difference (14-16). ITS analysis calls for multiple repeated observations made before and after an intervention. Time trend series' from before and after the intervention are then compared statistically. ITS can help to distinguish intervention effects from secular trends. However, it was not logistically or financially feasible to conduct multiple employee surveys before and after the implementation of Healthy@Work. There were concerns about over burdening TSS employees with surveys and the effect this would have on response rates, as the TSS regularly issues employees with work climate and other surveys. Another technique, difference-in-difference, compares outcomes from a treatment group at two or more time points with those from a control group. Healthy@Work was being rolled out across the TSS as a whole with no control group. The most appropriate design therefore for the researchers to be able to estimate outcomes from the TSS employee population was to conduct cross-sectional surveys at two time points using sound sampling (stratified random sampling) practices.

There are advantages and disadvantages of survey methods. Repeated cross-sectional designs do not allow assessment of changes within individuals over time or causal inference to the same degree afforded by randomised controlled trials or cohort studies. Statistical power can be greater in longitudinal cohort analyses due to reduced sampling error (17, 18). Further, repeated cross-sectional samples may

be subject to migration. For example, respondents who received minimal exposure to an intervention, such as new employees, may be included in the subsequent sample. It might be possible to restrict the analyses of a cohort study to continuing participants but rarely would this be feasible in an anonymous cross-sectional survey. As a second example, employees who received a high intervention dose may leave the organisation and not be included in the subsequent sample (17). Either source of migration would diffuse an intervention effect (19). Nevertheless, repeated cross-sectional analyses are useful for providing a snapshot of the key health and work factors for the broader population, are appropriate for evaluating a large-scale program targeted at an entire defined population, and there is evidence of cohort and cross-sectional analyses achieving comparable estimates (9). An ultimate aim of Healthy@Work was to help improve the health and reduce the health-related risk factors of approximately 29,000 employees. The primary unit of focus was the entire employee population, and this prompted parallels to be drawn to community-based intervention studies and the methods used to detect changes in populations. As such, a repeated cross-sectional design was selected as the most suitable method to assess TSS population-level health lifestyle factors and Healthy@Work program outcomes.

The work included in this thesis is drawn from the overarching pH@W repeated cross-sectional design. Chapters 3 and 4 contain cross-sectional analyses using the 2010 dataset, and Chapters 5 to 7 employ cross-sectional analyses using the 2013 dataset. Chapter 7 additionally includes comparisons of repeated measures of lifestyle factors collected in 2010 and 2013 surveys.

2.2.1 Sample size

Response proportions to workplace questionnaires are characteristically moderate to low (20, 21). Nevertheless, previous research has demonstrated that health risk assessments analogous to the *p*H@W surveys yield similar estimates of prevalence of health-related and work-related factors across subsamples with different response, even when response percentages are as low as 20% (22). For the *p*H@W surveys, *a priori* power calculations and estimated response proportions were used to determine sample sizes. This was done with the aim of attaining samples that

provided sufficient power to detect meaningful differences in risk factor prevalence, and that would allow sub analyses by important sociodemographic and work factors. For each survey, the required sample size was approximately 20% of TSS employees. Allowing for anticipated response proportions of 50%, approximately 40% of TSS employees (12,179 employees in 2010, and 12,008 in 2013) were invited to participate in each survey.

2.2.2 Sample stratification

Those invited to participate at each time point were selected by stratified random sampling. Stratification in the *p*H@W sampling processes was by government agency/department, employment condition (full-time or part-time), and employment category (permanent or fixed-term/casual contracts). These factors were selected because they were plausibly related to lifestyle-related chronic disease or were considered to be of particular interest to the *p*H@W researchers and TSS partners. Stratified sampling designs are advantageous when a population can be divided into strata, or subpopulations, that are more homogenous than the whole population in terms of characteristics that are plausibly related to the survey outcomes. If the shared characteristics are related to survey outcomes, this process reduces sampling error and, if the strata populations are themselves sub-groups of interest, helps to ensure sufficient data to support subgroup analyses and thereby improve the precision of those sub-analyses (23).

2.2.3 Sampling procedure

Unique TSS employee ID numbers that identified all TSS employees were obtained from TSS agency records. Using these TSS ID numbers, employees invited to participate were selected by random sampling within each stratum but with all (one hundred percent of) employees included from the smallest government agencies in 2013. Oversampling was performed for a number of reasons. First, in very small agencies there was a risk that data from a limited number of respondents could be identifiable if results were to be reported at an agency level. Second, sufficient respondent numbers were needed from each agency to fulfil reporting obligations to the TSS. Third, this increased the numbers available for appropriate weighting and analysis in each agency and work characteristic stratum.

2.3 *partnering*Healthy@Work surveys

2.3.1 Survey design

The *p*H@W researchers, in collaboration with TSS partner investigators, designed the surveys to assess the mean levels or prevalence of modifiable cardio metabolic risk factors, common chronic disorders, health service use, productivity (absenteeism and presenteeism), work stress and factors relating to the psychosocial work environment. Well-tested and commonly used population questionnaires were used where available. The survey items and response options of these questionnaires are described in detail in the relevant thesis chapters. Additional questions about the availability of, and participation in, different types of workplace health promotion activities were also included to assess program reach and engagement. In addition, *p*H@W survey items were chosen to correspond with data collected by the Tasmanian State Service in their own Healthy@Work employee online surveys, although data from the H@W online surveys are not used in this thesis.

The key content of the surveys remained identical across the two surveys for comparability (Appendices 1 and 2). However, following the implementation of Healthy@Work, additional items were included in the 2013 *p*H@W survey to measure factors associated with program implementation and participation. Items relating to employee self-reported benefits following participation in activities (Chapter 7), and implementation and socio environmental factors proposed to enable participation (Chapter 6), were drawn from a previous large-scale evaluation of WHP programs (24). Items relating to barriers to participation in WHP activities were formulated based on constructs derived from a review of the literature (Chapter 6). The items addressed privacy, work issues and health-related barriers. Other researchers have since used similar constructs (25).

2.3.2 Lifestyle factors and anthropometric measures

All lifestyle factor measures are described in detail in Chapter 3. In brief, health-related behaviours and psychological distress were measured by self-report using population health surveillance instruments with tested reliability and validity. Body mass index (BMI) was calculated from self-reported weight (kg) and height (m) as

BMI = weight/height^2, and weight status was categorised using established BMI cut points.

2.3.3 Sitting at work

Addressing sedentary behaviours in the workplace was a priority health focus for Healthy@Work, but tested questionnaires for measuring for sitting at work were not available when the 2010 survey was compiled in 2009. The *p*H@W researchers, therefore, developed a set of questions to capture information on time spent sitting at work on a typical day, and the average number of breaks in sitting. The questions were designed in a similar format to the International Physical Activity Questionnaire (IPAQ) (26), and immediately followed the IPAQ in the survey layout. The researcher-designed occupational sitting measure is described in detail in Chapter 4.

Other research groups have subsequently developed comparable instruments, and the instruments have been demonstrated to have good reliability and validity (27, 28). One of these is the Occupational Sitting and Physical Activity Questionnaire (OSPAQ). It is a brief measure that was developed and tested in 2012 (28). In order to compare estimates of time spent sitting at work made from responses to the pH@W occupational sitting measure with the estimates that would have been obtained had the OSPAQ been used, 500 employees selected to receive a *p*H@W survey in 2013 were chosen at random to also receive a supplementary set of questions that contained the OSPAQ. Of those 500 persons, 107 completed both sets of questions. The estimates of mean time spent sitting at work were 4.5 (SD 2.5) hours per day using the pH@W occupational sitting measure and 4.6 (SD 2.9) hours per day using the OSPAQ, with a minimal difference between measures of -0.1 (SD 2.1) hours per day. The intraclass correlation coefficient (ICC), measured using the ICC formula of Shrout and Fleiss (29), was 0.72, indicating substantial consistency between methods because variation between persons in the sample accounted for nearly three-quarters of the total variation in the measurements.

2.3.4 Survey distribution

The information sheet, consent form and survey instrument were mailed to either a work or home address of each employee invited to participate in the survey. The

address details were those captured in the administrative data provided by each agency. The paper-based distribution was used at the request of the TSS because significant numbers of employees were identified as not having a work email address. The respondents provided informed consent, and returned the completed survey forms in reply-paid envelopes to the Menzies Institute for Medical Research. The survey forms were returned directly to the researchers, rather than the TSS employer, to enhance the likelihood of higher response rates and to avoid the possibility of disclosure of potentially sensitive health- and work-related information. Identifiable survey data was not made available to the TSS.

2.4 Tasmanian State Service Administrative data

Survey data were linked with an extract of TSS human resources administrative data so that analyses could include important socio demographic variables such as respondents' employment conditions (if they were on permanent, fixed-term or casual contracts), employment category (whether they were working full-time or part-time), annual salary range, and the TSS agency in which they were employed. Additional administrative data were made available on industrial awards, which apply minimum employment conditions and wages to occupational categories. Each sampled employee was assigned an additional unique pH@W survey ID. The TSS administrative data were matched to survey respondents using these corresponding IDs.

2.5 Statistical analyses

The methods of analyses are described in detail in each of the chapters. All analyses were conducted using STATA, versions 11 or 12.

2.5.1 Response proportions and weighting of data

The response proportions for the *p*H@W surveys were 28% (3,408/12,179) in 2010 and 27% (3,228/12,007) in 2013. Using a method described by Hofler and colleagues (30) and Seaman and White (31) to address possible bias, the data were weighted in analyses using the inverse of the estimated probability of non-response estimated by logistic regression. In effect, this method uses the data of respondents to additionally represent the data of non-respondents to whom the respondent is

comparable in terms of the estimated probability of non-response. Inverse probability weighting thus allows inferences to be drawn for the initially sampled population, similar to if all survey recipients had responded. The probability of non-response was estimated using a logistic regression model that included binary covariates for the stratification factors (work category, employment contract, government agency) and covariates for other characteristics (sex, age, employment duration) for which data were available for the entire sample.

2.6 Ethics

The research had ethical approval (reference no. H0010501) from the Human Research Ethics Committee (Tasmania). Participation was voluntary, and the survey responses were treated in confidence. Respondents were assigned a unique identification (ID) number, and consent forms were stored separately from the surveys. The completed questionnaires and subsequent electronic data were identified by ID code only and did not include names or other identifying information.

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Chapter 3

Workplace health promotion: what public-sector employees want, need, and are ready to change.

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Chapter 3. Workplace health promotion: what public-sector employees want, need, and are ready to change

3.1 Preface

Workplaces are commonly encouraged to integrate employee health-risk assessments and involve employees in designing programs. Inconsistencies between what employees want, need, and are ready to address pose an implementation challenge to organisations; do organisations address the stated or observed need? This chapter aims to map employee lifestyle factors against prioritised health change targets, and examine readiness to change the nominated target. The following text of this chapter has been published in the Journal of Occupational and Environmental Medicine.

3.2 Introduction

Many chronic illnesses, such as cardiovascular disease, Type II diabetes, and common mental disorders, are associated with adverse lifestyle factors (1, 2). These include cigarette smoking, poor diet, high alcohol consumption, physical inactivity, sedentariness, and overweight / obesity. Although adoption of healthy behaviours can reduce the morbidity and mortality of many non-communicable diseases (3, 4), unhealthy lifestyles are widespread and pervasive (5). There is an imperative for public health policy to promote healthier lifestyles.

Workplaces represent important avenues where health and wellbeing can be promoted and supported. Extant literature provides evidence that workplace health promotion (WHP) can positively influence employee health behaviours and stress (6-11). Since adverse lifestyle factors have been associated with employee productivity, absenteeism and disability-related absences (12, 13), employing organisations have a further incentive to embrace WHP (14). However, employee participation rates vary greatly (15), and a tendency for healthier, lower-risk employees to engage in such programs exists (16). Consequently, the capacity for programs to support improvements to health in those most at risk can be compromised.

A variety of strategies are commonly employed to inform WHP design and enhance employee engagement (17). Health-risk assessments can form the basis of brief

interventions by providing customised feedback to individuals (18), or the results may be used to identify aggregate worker needs. Participatory processes have been used with some success by involving employees in decisions regarding program content and delivery (19). Another common approach is to tailor interventions to an employee's readiness to change their behaviour. While equivocal results for the efficacy of stage-matched techniques have been obtained (20, 21), these methods have proven to be useful in several workplace health promotion interventions targeting physical activity behaviour change (22-24).

Despite the research regarding these engagement strategies, few studies have addressed how relevant employee-prioritised health promoting activities are for improving their health and wellbeing. Further, it is unclear whether there are potential discrepancies between what employees want, need, and are ready to address. Campbell and colleagues (25) explored readiness to change health behaviours in blue-collar female workers, concluding that tailoring interventions to behavioural priority could increase the likelihood of successful behaviour change. The purpose of the present study was to investigate self-nominated health change targets (HCTs) in male and female public-sector employees across a diverse range of occupations, and their consistency with individuals' self-reported modifiable risk factors for disease. Similar to Donovan et al, (26) the HCTs were measured using an open-ended question asking what the employee could do to become more healthy, and how ready the employee was to make that change. The cross-sectional research had two aims: 1) to compare risk-related lifestyle behaviours (smoking, nutrition, alcohol intake, physical activity, sedentariness) and psychological distress with employee responses regarding changes they could make to promote health, or prevent ill-health; and 2) to explore the readiness of respondents to make the change nominated.

3.3 Methods

3.3.1 Study population

This study used data collected in Tasmania, Australia in 2010, as part of the *partnering*Healthy@Work collaboration. The partnership's aim was to evaluate Healthy@Work, a Tasmanian state government initiative designed to support all

state government agencies to implement workplace health promotion. The study population was a stratified random sample of state service employees, with stratification by government agency, employment contract (permanent, casual/fixed term) and work classification (full-time, part-time). Written, informed consent was obtained and returned with the reply-paid paper-and-pen survey. The research had ethical approval from the Human Research Ethics Committee (Tasmania), reference no. H0010501.

3.3.2 Measures

Sociodemographic and health characteristics

Information was collected on sociodemographic variables, including age, sex, and education level. Health status and number of cardio metabolic- and respiratory-related chronic health conditions were self-reported. Body mass index (BMI) was calculated from self-reported weight (kg) and height (m) as BMI=weight/height^2.

Lifestyle factors

In this study we assessed diet using two items derived from the Australian National Nutrition survey (27). Previous research has favourably compared the estimates derived from these brief questions to concentrations of diet-related micronutrients detected in blood serum (28). Participants estimated the number of serves of vegetables (excluding potatoes) or fruit usually eaten each day. One serve equated to: half a cup of cooked vegetables; one cup of salad vegetables; one medium-sized piece of fruit; one cup of diced fruit. Response options ranged from ‘do not eat’ to consuming ‘six or more serves’ per day. Alcohol intake was assessed using the three-item AUDIT-C (Alcohol Use Disorders Identification Test) (29). The AUDIT-C measures the frequency of alcohol intake, the typical quantity consumed on a day when drinking, and instances where five or more standard drinks are consumed on one occasion. To estimate physical activity and time spent in sedentary behaviours, participants completed the long-form of the International Physical Activity Questionnaire (IPAQ) (30). Psychological distress was measured using the Kessler Psychological Distress scale (K10) (31, 32). The scale uses 10 items to assess the level and severity of distress. Questions relate to anxiety and depression symptoms experienced during the previous four weeks. Five-level responses range from “None

of the time" to "All of the time", and total scores from 10 to 50. Higher scores indicate increased levels of psychological distress.

Health change targets (HCTs) and stage of change

Participants responded to the question 'What would you say is the single most important thing you personally could do to improve your health or reduce your risk of getting sick?' Respondents were also asked whether they were "not thinking of making this change" (pre-contemplation), "thinking of making this change, but not in the next two weeks" (contemplation), "thinking of making this change in the next two weeks" (preparation), or "trying to make this change at the moment" (action) (26). These HCT and readiness to change questions were asked early in the questionnaire battery to avoid contamination by having just answered health assessment questions.

3.3.3 Data analysis

Categorisation of lifestyle factors

Weight status was categorised as underweight/normal (BMI<25kg/m^2), overweight (25≤BMI<30kg/m^2) and obese (BMI≥30kg/m^2). Subjects were categorised on the basis of their cigarette smoking as current daily smokers or not (combining ex-smokers and never-smokers). Using Australian dietary guidelines (33), those who consumed two or more serves of fruit and five or more serves of vegetables every day were categorised as consuming the minimum intake recommended to promote health. For alcohol use, AUDIT-C total scores ranged from 0 to 12. Respondents were categorised as at risk drinkers based on the General Practice guidelines (34) for identifying hazardous drinking or active alcohol use disorders (reflecting approximately 14 or more standard drinks per week and/or frequency of heavy drinking). Physical activity was categorised as high risk if respondents reported less than the 150 mins/week of moderate-vigorous leisure-time physical activity recommended for health benefit (35). For sitting, no guidelines currently exist that quantify a maximum 'safe' level of engagement in sedentary behaviours by adults. In the absence of any established recommendations, we classified participants as high risk if they reported sitting for six or more hours per day, on average (36).

Psychological distress total scores were dichotomised as low (K10 total score: 10-21) and high (22-50) (5).

Coding health change targets

Three members of our team (including MK and KS) independently coded the free-text responses to the HCT question. The small number of discrepancies in coding were resolved following discussion between the researchers. Despite the question asking for a single health change focus, 17% of respondents offered more than one target (maximum four). To ensure that all employees contributed equally to HCT computations, the multiple responses were assigned equal weights summing to unity in weighted analyses.

3.3.4 Statistical analysis

Means (with standard deviations) and proportions were calculated to summarise demographic factors. Proportions of respondents at risk in respect of each lifestyle factor are reported, and cross-tabulated against each of the HCT themes. In confirmatory analyses, non-missing data were weighted for non-response using the methods described elsewhere (37) and the analyses were repeated.

3.4 Results

Of the eligible sample of 12,179 Tasmanian State Service employees, 28.0% (3,408/12,179) completed the paper-based questionnaire. After excluding 41 respondents with missing data on key variables, the final study sample included 3,367 subjects. The responders and non-responders differed in proportions of each sex (28.3% of responders were males compared to 35.3% of non-responders) but otherwise were similar in key respects including mean age (responders 46.2 years, non-responders 44.4 years), employment contract (91.4% of responders were in permanent employment compared to 88.1% of non-responders) and employment category (60.4% of responders were in full-time employment compared to 60.8% of non-responders). Comparison of the participant data with whole of state service administrative data showed the responding participants were similar in respect of every employment characteristic for which data are available. For example, approximately 70% of state service employees in 2010-2011 were female (38).

Table 3.1 Characteristics of participants in the *partnering*Healthy@Work survey of Tasmanian State Service employees conducted in 2010

	Men 28% (n = 946)		Women 72% (n = 2421)	
Age (years), mean (SD)	47.0	(10.0)	45.8	(10.4)
Age group				
<30 years	6.1%	(58)	9.6%	(233)
30-39 years	17.6%	(166)	17.3%	(418)
40-49 years	30.0%	(284)	31.1%	(754)
50-59 years	37.5%	(355)	35.1%	(850)
60+ years	8.7%	(83)	6.9%	(166)
Marital status				
Married/living as married	83.3%	(767)	74.2%	(1755)
Separated/widowed/single	16.7%	(154)	25.8%	(609)
Education				
≤ Year 12	17.2%	(161)	22.0%	(526)
Trade/certificate/diploma	30.1%	(281)	23.7%	(565)
University	28.5%	(266)	31.6%	(755)
Postgraduate	24.2%	(226)	22.7%	(543)
Work condition				
Full-time work	84.8%	(802)	50.8%	(1229)
Part-time work	15.2%	(144)	49.2%	(1192)
Work category				
Permanent	88.3%	(835)	92.6%	(2241)
Full time/casual	11.7%	(111)	7.4%	(180)
Self-rated health				
Excellent/very good/good	86.4%	(816)	88.7%	(2143)
Fair/poor	13.6%	(128)	11.3%	(11.3)
Chronic health conditions				
Respiratory *				
None	91.8%	(830)	88.4%	(2019)
One or more	8.2%	(74)	11.6%	(265)
Cardio metabolic †				
None	73.9	(682)	80.7	(1871)
One	20.0	(185)	15.4	(356)
Two or more	6.1	(56)	4.0	(92)

*Respiratory chronic health conditions: chronic obstructive pulmonary disease, asthma, bronchitis. †Cardio metabolic health conditions: high blood pressure or hypertension, congestive heart failure, coronary heart disease, diabetes, high blood cholesterol

Information on the sociodemographic characteristics of these respondents is reported in Table 3.1 above. The mean age was 46.2 (SD=10.3) years, with 71.9% women. Over half the participants (53.8%) reported university or post-graduate education, and the majority of men (83.3%) and women (74.2%) were married or living as married. More women (49.2%) than men (15.2%) were in part-time employment, and 91.4% of participants were permanently employed. With regard to chronic health conditions, 8.2% of men and 11.6% of women had one or more respiratory-related conditions, and 26.1% of men and 19.4% of women reported one or more cardio metabolic-related conditions. Overall, 81.1% of all respondents reported being in good, very good, or excellent health.

3.4.1 Proportions of HCTs nominated according to each lifestyle factor

Fourteen HCTs were identified (Table 3.2 below). The most frequently nominated HCTs were PA (47.4%), diet (18.8%) and weight (17.2%). Work and stress were chosen by 8.9% and 8.7% of respondents, respectively.

3.5 Prevalence of risk-related lifestyle factors

More than half (56.1%) the respondents were overweight or obese, 47.6% of the sample reported potentially hazardous drinking and 79.1% did not meet either or both dietary guidelines (Table 3.3, below). In the week preceding the survey, half the respondents were insufficiently physically active, while 35.5% reported sitting for six or more hours/day, on average. The proportion of current daily smokers (7.5%) in the sample was lower than Tasmanian adult population estimates (5), where 21.8 % were estimated to be current daily smokers in 2011-12. A total of 340 (10.7%) employees reported high-risk psychological distress.

Table 3.2 Proportions, category definitions and example responses for chosen health change targets (HCTs)

HCT	%* (n)	Definitions: *example responses*
Physical activity	47.4 (1510)	Increasing or maintaining activity levels, improving fitness: *exercise regularly; be more active; become fit; continue to be active*
Diet	18.8 (598)	Improve or maintain nutritional intake, reduce intake: *eat healthier; eat better; diet; balanced meals; eat less*
Weight	17.2 (547)	Reduce weight, maintain healthy weight: *reduce my weight; lose weight; lose 10kg; maintain a health weight*
Work characteristics	8.9 (286)	Change to work role, conditions, or hours; work/life balance: *work less, change job or retire, more improved work/life balance*
Stress	8.7 (276)	Manage stress or relax: *reduce stress, more yoga (de-stressing activities), find time to relax, meditate more regularly*
Smoking	5.4 (172)	Quit, or alter pattern of smoking: *give up smoking, quit smoking, abstain from casual smoking*
Alcohol	3.2 (102)	Reduce, stop, or alter pattern of alcohol consumption: *less alcohol, stop drinking, less binge drinking*
Sleep	2.9 (92)	Adequate sleep and rest, reduce fatigue*: more rest, get more sleep, increase quality sleep, sleep better, go to bed earlier*
Lifestyle	2.2 (70)	General, broad attention to health: *healthy lifestyle, maintain a healthy active lifestyle, everything in moderation, balance*
Specific health	2.2 (70)	Management of specific health concern: *reduce cholesterol, control my diabetes, flu shot, continue yearly mammograms*
No change	0.8 (26)	Maintain current health and behaviours: *nothing, my health is fine, live a healthy lifestyle now, continue what I am doing*
Unusual	0.5 (17)	Unusual or unrealistic answers for health promotion: *change my genetic makeup and predisposition, stop getting old, die*
Hygiene	0.2 (6)	Preventive measures against contagious illness: *wash hands, avoid sick people and increase hygiene protection, good hygiene*
Outdoors	0.1 (3)	Reference to being outdoors or in nature: *get more sun, stay close to nature, spend more time outside in fresh air*

*Percentages total >100% as some respondents nominated more than one health change target

Table 3.3 Prevalence of lifestyle factors, and proportions of nominated health change targets (HCTs) according to lifestyle factors

		Selected as a health change target									
Lifestyle factors	%(n)	Smoking cessation %(n)	Diet %(n)	Alcohol %(n)	Physical activity %(n)	Stress %(n)	Weight %(n)	Work %(n)	Sleep %(n)	Lifestyle %(n)	Specific health %(n)
Smoker											
Non/ex	92.5(2721)	0.3(9)	19.9(542)	3.0(81)	49.7(1353)	9.3(253)	17.9(488)	9.6(262)	3.1(83)	2.3(63)	2.2(61)
Current daily	7.5(222)	68.9(153)	4.5(10)	2.7(6)	17.1(38)	2.3(5)	6.3(14)	4.1(9)	0.5(1)	1.4(3)	2.7(6)
Diet											
Meets guidelines	20.9(669)	3.3(22)	15.8(106)	3.4(23)	49.0(328)	9.1(67)	17.2(115)	10.3(69)	3.2(21)	1.9(13)	2.1(14)
Does not meet	79.1(2542)	6.0(150)	19.5(490)	3.1(78)	47.0(1180)	8.6(215)	17.2(431)	8.6(217)	2.8(71)	2.3(57)	2.2(56)
Alcohol											
Low risk	52.5(1662)	3.4(56)	19.5(324)	0.4(6)	49.9(829)	9.5(158)	16.2(329)	9.6(160)	3.2(52)	2.4(39)	2.8(46)
High risk	47.6(1507)	7.7(116)	17.9(253)	6.4(96)	44.7(673)	7.8(117)	18.3(275)	8.2(124)	2.7(40)	2.1(31)	1.6(24)
LTPA* (mins/wk)											
=>150	49.2(1566)	4.4(69)	22.5(352)	4.0(63)	43.7(685)	9.5(149)	15.8(248)	9.3(146)	3.5(55)	2.4(37)	2.6(41)
<150	50.8(1617)	6.2(101)	15.2(246)	2.4(39)	50.9(823)	7.9(127)	18.5(299)	8.7(140)	2.3(37)	1.8(30)	1.8(29)
Psych. Distress											
Low risk	89.3(2837)	5.1(143)	19.5(548)	3.3(92)	48.4(1359)	7.9(222)	17.1(480)	8.2(231)	3.0(83)	2.3(64)	2.2(63)
High risk	10.7(340)	7.1(24)	13.4(45)	3.0(10)	39.7(133)	15.2(51)	17.9(60)	15.2(51)	2.4(8)	1.5(5)	2.1(7)
Weight											
Under/Normal	43.9(1292)	5.0(64)	22.8(295)	4.8(62)	45.8(592)	11.9(154)	3.4(44)	10.5(135)	4.8(62)	3.7(48)	2.9(37)
Overweight	34.4(1013)	6.6(67)	18.4(186)	2.5(25)	52.4(531)	6.7(68)	18.1(183)	8.5(86)	1.3(13)	1.2(12)	2.2(22)
Obese	21.7(638)	4.9(31)	12.9(82)	1.3(8)	44.7(266)	4.2(27)	44.5(284)	5.8(37)	1.4(9)	1.1(7)	0.8(5)
Mean sitting hrs/day											
<=6hrs	64.5(2006)	5.3(111)	19.0(381)	2.8(56)	46.9(940)	9.0(181)	17.1(342)	9.2(184)	3.0(60)	2.4(49)	2.2(45)
>6hrs	35.5(1105)	5.0(55)	18.4(203)	3.7(41)	48.7(538)	8.0(88)	17.5(89)	8.9(98)	1.3(6)	1.6(18)	2.1(23)

*LTPA = leisure-time physical activity

3.5.1 HCTs nominated by respondents classified by lifestyle factors

The proportions of respondents in each category of each lifestyle factor who nominated 10 of the health-related targets for change are presented in Table 3.3 above.

Four HCTs were not included due to the low numbers in these categories. Where a lifestyle factor mapped to a HCT, respondents at highest risk for each lifestyle factor more commonly nominated action on that lifestyle factor than did those at lower risk. Because they were asked to nominate only one HCT, and most complied with that direction, respondents less commonly nominated action on other lifestyle factors as a HCT. Higher proportions of respondents at high risk of psychological distress than those at lower risk nominated stress and work as HCTs. Hours of sitting did not map strongly to any of the HCTs. Sufficiently active respondents were almost as likely to nominate PA as those classed as insufficiently active. Additional results (not shown) found respondents with no versus one or more cardio metabolic- or respiratory-related chronic health conditions showed little difference in HCTs. Furthermore, to confirm the robustness of our conclusions, the analyses were repeated using inverse probability weighting of the non-missing data to represent the missing data of similar individuals. The results were almost unchanged.

3.5.2 Readiness to change nominated HCTs

To determine the readiness to change HCTs, and to help identify ready targets for intervention, the four stages-of-change proportions were calculated for each HCT (Figure 3.1 below). Many respondents reported currently trying to address their chosen target (action stage). In contrast, those who nominated work, alcohol, or smoking were less likely to be in the ‘action’ stage, (44%, 54% and 26% respectively). The majority of smokers were not contemplating change in the near future.

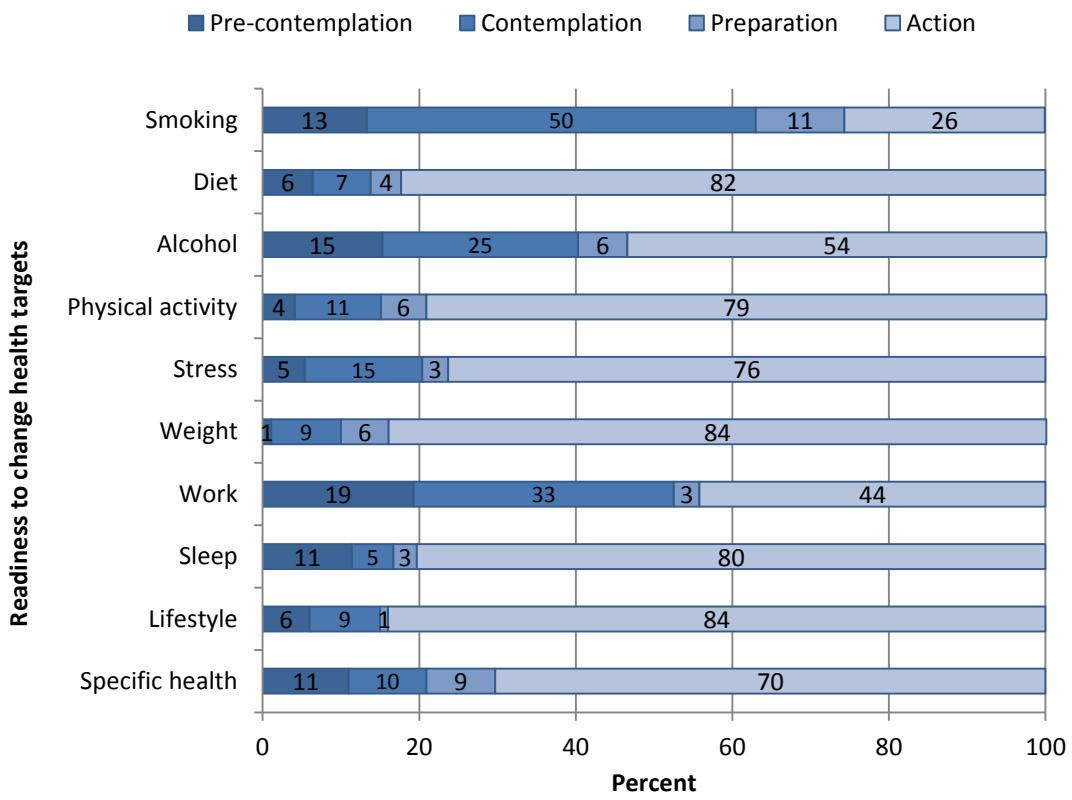

Figure 3.1 Readiness of respondents to change their chosen health targets, represented as the percentage of those in pre-contemplation, contemplation, preparation and action stages for each health change target

3.6 Discussion

We wanted to identify the appropriateness of lifestyle modifications chosen by employees to improve their health or prevent ill health. There were two elements we studied in determining this: the consistency of individuals' nominated health change targets (HCTs) with their lifestyle factors, and readiness to address a HCT. Consequently, our study yielded two main findings. The first demonstrated that employees predominantly designated relevant health change targets. The second found the majority of employees were already attempting to address their HCTs, with the exception of smoking cessation, work characteristics and to a lesser degree alcohol intake.

With regard to the first finding, physical activity was the most popular HCT. Many employees, including almost half of those classified as sufficiently active, chose increasing physical activity as the most important change they could make for their health. The remaining HCTs typically aligned with respondents' corresponding health

behaviours. Few studies have examined the agreement between modifiable lifestyle factors and employee-prioritised targets health change. Our first finding demonstrates that employee perceptions of the ways they could best improve their health, or prevent ill health, are likely to be consistent with their self-reported health. Thus, if consulted as part of participatory approach, employee input is likely to be highly valuable when tailoring workplace program design relevant to health needs. Moreover, interventions promoting increased physical activity are likely to be acceptable to both active and inactive employees, and those presenting with other risk-related lifestyle factors. It is well established that physical activity positively affects many facets of health and wellbeing. Offering activity promoting interventions may simultaneously address some of the ill effects associated with other important health determinants. For workplace health facilitators, the advantages of a well-received and attended physical activity program could be visible, widespread engagement that draws attention to additional lifestyle-change initiatives and increases the potential for cultural change. Less advantageous is the potential allocation of resources towards employees with already healthy lifestyles, away from those at higher risk.

The second main outcome of this study demonstrated that with the exception of smoking cessation, changes to work characteristics, and reducing alcohol intake, employees were ready to take action on, or were currently addressing, their HCTs. These findings build on work by Motley and Prelip (39) who investigated the readiness to change health behaviours in 705 hospital employees for a workplace wellness program. Similar to the present study, Motley and Prelip found high readiness to engage in physical activity and weight control. Our study comprised a larger sample size and expands upon their use of a single-site hospital setting to include a diverse range of worksites and employees.

In the current study, smoking was identified by the majority of daily smokers as the most important modification they could make for their health. Yet many were not immediately prepared to change this behaviour. Our findings concur with previous research that demonstrated low readiness to quit smoking even if identified as a prioritised health change (25). Smoking is known to be a highly addictive behavior,

and even at low levels daily smoking has recognised harmful health implications (40). Without detracting from the established health benefits associated with physical activity, chosen by almost one-fifth of smokers in our study as their HCT, habitual smoking is more likely to adversely affect health long-term (41). As such, all daily smokers in the present study would have ideally chosen smoking cessation as the most important focus for change. Since the proportion of regular smokers in the current research was lower than population levels of smoking, not unexpected in a characteristically educated working sample, it is probable that a core of addicted smokers remains that are either resigned to or accepting of their habit. Workplace health promotion facilitators need to be aware of such challenges to enable access to evidence-based individual or group counseling, or pharmacological treatments targeting nicotine addiction (11). Such knowledge will also prepare facilitators for variable uptake and outcomes for programs supporting smoking cessation.

Similarly, respondents demonstrated less preparedness to change their alcohol consumption. Forty percent of respondents who prioritised a reduction to their alcohol intake were not contemplating changing their patterns of alcohol use in the near future. The likely implications for workplace intervention, within a broader culture that embraces social drinking, are to highlight harms through brief interventions and lifestyle risk assessments that increase motivation to change (42). Equally, many employees who nominated changes to their work characteristics as being important to their health were not preparing to affect imminent change. It is conceivable that respondents were expressing a desire unable to be practicably realised. A number of respondents chose a reduction in work hours or retirement; in reality, decreasing work involvement may not be a feasible option due to financial, personal or other constraints.

A strength in our study is the inclusion of sitting as a behavioural risk factor. Interestingly, those sitting for six or more hours a day were no more likely than those reporting other risk-related behaviours to want to increase their physical activity. Moreover, very few respondents qualitatively specified a need to reduce their sitting. This might reflect the nascent understanding of the mortality and other health risks associated with sedentary behaviours, independent of how much

moderate or vigorous physical activity people are achieving. Our results demonstrate that employees may lack awareness concerning prolonged sitting as a potential health risk, and are therefore unlikely to nominate a reduction to sitting time as a specific health priority. The need for interventions that encourage employees to minimise or interrupt sedentary behaviour at work and in leisure will need to be driven by employers and workplace health facilitators until broader awareness of the risks increases.

There are limitations to the current study. Self-reported data may be biased, particularly where employees are asked to report negative or harmful behaviours. Where possible, well-validated measures were incorporated in the survey design to increase the likelihood of accurate measurement of lifestyle factors. It is possible that the low response rate may have created non-response bias, but there is no way of determining this with certainty. We had some information about employees who did not respond to the survey as a result of the stratified random sampling process. Hence, we were able to conduct confirmatory analyses by weighting non-missing data using the inverse of the estimated probability of non-participation for each survey participant. This process helps to address possible non-response bias by adjusting the weights given to data from survey recipients who did respond to account for survey recipients most similar to them who did not respond, and who were therefore underrepresented in the final sample. Alternatively, a response bias may exist where employees already addressing healthy lifestyle determinants were more likely to respond to a health-focused survey. In addition, the health change question used in our study was framed as a general query, and was not limited in scope by intervention type, setting, or feasibility of affecting change. Responses could have differed if employees were directly queried about important health modifications that could be enabled via workplace health promotion. Finally, it remains unclear in the literature whether readiness to change or stage progression equates with or leads to behaviour change. Variable results have been reported for health behaviours interventions informed by stages-of-change theory (43) (44). A criticism of intervention design based on stage alone is that it can represent an oversimplification of a more complex model (45). Nevertheless, the stages-of-change

approach remains widely used in health promotion, and in many instances offers a practicable way for organisations to measure intention, the most proximal predictor of likely behaviour change.

3.7 Conclusion

In conclusion, our findings show that employee perceptions of the important changes they could make to improve health, or prevent ill health, were broadly appropriate when mapped against self-reported lifestyle factors. Energy-balance health change targets dominated, with physical activity, diet and weight the most prevalent choices. Physical activity was a popular target for change with both physically inactive and physically active respondents, demonstrating that physical activity intervention in the workplace are likely to appeal to those who already value and maintain health-promoting levels of activity. Most employees were ready to change or were already making changes to their chosen health focus, with the exception of smoking cessation, work factors, and to a lesser degree alcohol intake.

3.8 Postscript

The results of this chapter suggest that employee health risk assessments and employee program preferences are likely to align, which provides reassurance to organisations and WHP facilitators seeking to implement WHP programs relevant to employee health preferences and needs. With regard to employee health needs, the Tasmanian State Service had included sedentary behaviour as a focus of Healthy@Work, acknowledging the burgeoning research relating to the impacts of prolonged sedentary behaviour and how this might affect State Service employees who sat to perform their work duties. These emphases lead to the examination of sitting at work and psychological distress, which is presented in Chapter 4.

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Chapter 4

Cross-sectional associations between sitting at work and psychological distress: reducing sitting time may benefit mental health

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Chapter 4. Cross-sectional associations between sitting at work and psychological distress: reducing sitting time may benefit mental health

4.1 Preface

Sedentary behaviour was a prioritised focus of Healthy@Work. Despite sitting at work accounting for a large proportion of total sedentary behaviour, research has largely focused on leisure-time sitting, and physical health outcomes. This chapter aims to examine sitting at work and psychological distress, independent of leisure-time physical activity. The following text of this chapter has been published in the journal Mental Health and Physical Activity.

4.2 Introduction

Sedentary behaviour was long considered to represent the absence of physical activity, yet it is now accepted that physical inactivity and sedentariness are distinct phenomena with different physiological consequences (1). Defined by the Sedentary Behaviour Research Network (2) as any waking behaviour characterised by an energy expenditure ≤1.5 METS while in a sitting or reclining posture, sedentary behaviours have been associated with overweight and obesity (3), cardiovascular disease (CVD), Type 2 diabetes, (4-6), adverse cardio-metabolic markers (7), depression (8-10), mental well-being (11) and prospectively linked to all-cause and CVD-related mortality (12, 13). Such findings are typically independent of the amount of physical activity people engage in during their leisure time. Consequently, individuals may be meeting recommended levels of health promoting physical activity, yet their physical and mental health may remain at risk if they are also sedentary for prolonged periods.

The mechanisms underlying why sedentariness has been inversely associated with mental health remain unclear, and a recognised difficulty in elucidating the relationship is the possibility of reverse causality (14). Impaired mental health may promote increased time spent engaging in sedentary behaviours, or conversely, sedentary behaviours may negatively impact mental health. Moreover, evidence is emerging that the contexts within which active and sedentary behaviours occur

exhibit differential associations with mental health, and show distinct corollaries for men and women (15-20).

Sitting occurs in occupational, transport, leisure and domestic domains (21). Despite this, research into sedentariness has focused on leisure-time sitting, incorporating estimates of reading, TV viewing, computer or generic screen time (20). Time spent sitting at work, however, has been found to account for approximately half the average weekly sitting time across all domains (22), and many workers spend the majority of their workday seated (23, 24). Evidence is now emerging linking occupational sitting with adverse physical health outcomes, including higher risk for Type 2 diabetes, mortality and increased BMI (3, 25), yet limited extant research has explored sitting at work and mental health. Research by Proper and colleagues (19) examining occupational sitting found no evidence of a relationship between time sitting at work and mental well-being. Participants in their study were drawn from the fifth wave of a Dutch prospective population-based study. Consequently, the analyses included data from working adults aged 40 and over (n=513), precluding the consideration of work-related sitting in younger workers. Adjustment was made for physical activity levels, but there was no consideration of stress associated with work. Where possible, it is optimal to include psychosocial factors such as job-related stress as potential confounders, as dissatisfaction or strain associated with employment, including mundane, lower-skilled desk-based work, role demands or poor psychosocial climate can influence levels of employee stress. As such, there is a need to further explore sedentariness and mental health in the work domain, studying populations that span the customary age spectrum of working adults and addressing job stress as a possible confounder.

Public and workplace health campaigns, which have historically emphasised the importance of being physical active, are beginning to acknowledge the physical health benefits of also lessening exposure to prolonged and continuous sedentary behaviours (26). Moreover, nascent intervention studies have assessed techniques to reduce and interrupt sitting in the workplace, with the focus to date restricted to office-based settings and physiological and behavioural outcomes (27-30). The omission of the assessment of psychological implications in intervention research is

likely to endure while the relationship between mental health and prolonged sitting at work remains unclear. Thus, the aim of the current research was to investigate the association between occupational sitting and psychological distress, independent of leisure-time physical activity.

4.3 Methods

4.3.1 Participants

*partnering*Healthy@Work is a collaboration between the State Government of Tasmania, Australia, the Menzies Institute for Medical Research, and the University of Tasmania to evaluate Healthy@Work, a state government initiative designed to assist its departments to develop and implement workplace health and well-being programs. This study used data collected in the 2010 *partnering*Healthy@Work baseline survey of state government employees. The study population was a stratified random sample of employees with stratification by government agency, employment contract (permanent, casual/fixed term) and work type (full-time, part-time). The eligible sample consisted of 12179 Tasmanian State Service employees. With a response proportion of 28% (3408/12179), 3408 participants provided informed consent and completed the paper-based questionnaire distributed by mail. The final study sample for analysis of 3367 excluded 41 persons with missing data on key study factors.

4.3.2 Measurements

Sociodemographic characteristics

Information collected on sociodemographic and health characteristics included sex, age, level of education, marital status and physical functioning. Self-reported physical functioning was assessed using responses to the 12 Short-Form Health Survey questions that relate to physical health (SF-12; e.g. 'During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?). A Physical Component Summary Score (PCS) was derived for each respondent, with higher scores indicating better physical functioning. The PCS was chosen because the summary scores provide an estimation of physical functioning that is distinguished from aspects of mental health, and the SF-12 is a reliable and widely used measure (31). Body mass index (BMI) was calculated from

self-reported weight (kg) and height (m) as BMI = weight/height^2, and weight status was categorised as underweight/normal (BMI<25kg/m^2), overweight (25≤BMI<30kg/m^2) and obese (BMI≥30kg/m^2). Effort-Reward Imbalance, an indicator of work stress that compares occupational effort against perceived intrinsic and extrinsic rewards, was calculated according to responses on the Effort-Reward Imbalance scale (ERI) (32). Example questions, in reference to the respondent's work situation, include 'I experience adequate support in difficult situations' and 'I am treated unfairly at work'. Response options are 'Agree' or 'Disagree', and where applicable responders indicate their level of distress attributable to the statement (not at all distressed to very distressed). A ratio of the 'effort' and 'reward' scales is calculated, and scores over 1.0 represent an 'imbalance' theorised to place individuals at risk of work stress. For the current analyses, the continuous ERI ratio scores were categorised into five groups (<0.400, 0.400-0.599, 0.600-0.799, 0.800-0.999, 1.000+).

Psychological distress

Psychological distress was measured using the Kessler Psychological Distress scale (K10). It has demonstrated validity and reliability (33), and is predictive of respondents meeting criteria for a diagnosable depression- or anxiety-related disorder (34). The scale uses 10 items to assess the level and severity of distress, and is based on questions concerning anxiety and depression symptoms experienced during the previous four weeks (e.g. 'In the last four weeks, about how often did you feel depressed?'). A five-point response scale is used for each symptom with scores ranging from 1 = "None of the time" to 5 = "All of the time". Total scores vary from 10 to 50, with higher scores indicating increased levels of psychological distress. Based on cut-points used by the Australian Bureau of Statistics in population-based surveys, the total scores were grouped for analysis into ordered categories of low distress (K10 total score 10-15), moderate distress (16-21), high distress (22-29) and very high distress (30-50) (35).

Occupational sitting time

Using a format similar to the International Physical Activity Questionnaire (IPAQ), participants were asked to first estimate the time spent at the workplace on a typical day, and then to estimate the total time spent sitting at their workplace during a typical day, including through meal and snack breaks. Similar population-based measures have demonstrated reasonable reliability and validity when compared with objectively measured sedentary behaviours, and are considered suitable for population estimates of time spent in sedentary behaviour (36, 37).

Physical activity

Participants completed the IPAQ long form for physical activity estimates. The IPAQ assesses the intensity and duration of physical activity undertaken in the domains of work, active transport, leisure, and household-related duties during the previous seven days (http://www.ipaq.ki.se/ipaq.htm), and has acceptable reliability and validity (38).

4.3.3 Statistical analyses

Descriptive statistics are reported using means and standard deviations (SD) for quantitative data, and percentages for qualitative data. To address possible response bias (39), non-missing data were weighted for non-response in other analyses, using the inverse of the estimated probability of participation for each survey participant. The probability of participation was estimated using logistic regression of a binary response variable on binary covariates for the stratification factors (work category, employment contract, government agency) and covariates for the other characteristics (sex, age, employment duration) on which data were available for all eligible subjects.

Associations between variables are summarised with rank correlation coefficients in Table 4.2 below. Log multinomial regression was used to compare prevalence of moderate, high and very high levels of psychological distress (three of the four categories of the K10 scores) at levels of study factors including participant characteristics, occupational sitting and physical activity. Ratios of prevalence (PR) and 95% confidence intervals (CI) are reported. Results are presented separately for

men and women, because sex-related differences have been reported in the association between mental well-being and sedentary behaviours among working adults (11). A number of variables were identified *a priori* as potential confounders of the association between occupational sitting and mental health. Covariates for these potential confounders were included in the final model if their inclusion changed one or more of the estimated regression coefficients of covariates for the principal study factor by more than 10 percent, as recommended by Greenland (40). Covariates were included in the final models for age, marital-status, and effort-reward imbalance. Adjustment was made additionally for leisure-time physical activity to test whether the associations of psychological distress with occupational sitting were independent of discretionary physical activity.

4.4 Results

4.4.1 Participant characteristics

Unweighted participant characteristics for 3367 respondents are summarised in Table 4.1 below. The mean age of the sample was 46.2 (SD=10.3) years, with 71.9% of participants being women. Over half the participants (53.8%) reported university or post-graduate education, with the majority of men (83.3%) and women (74.2%) married or living as married. More women (49.2%) than men (15.2%) were in part-time employment, and 91.4% of participants were permanently employed. Based on a comparison with administrative data for the source population (all Tasmanian state service employees), characteristics of participants in our sample were largely representative of the employee population (for example, approximately 70% of state service employees in 2010-2011 were female). Overall, 81.1% in our study sample reported being in good, very good, or excellent health. More than one-half of participants were overweight (men 45.7%, women 29.9%) or obese (men 19.1%, women 22.3%).

Moderate psychological distress was reported by 22.4% of participants (men 19.1%, women 23.6%), while 10.8% recorded high (men 8.2%, women 8.0%) or very high (men 1.7%, women 3.1%) distress. Mean occupational sitting time on a typical workday was 4.8 (SD=2.5) hours for men and 4.2 (SD=2.7) hours for women. Participants on average reported leisure-time physical activity in the previous week

of 205.4 (SD=222.2) minutes, with means for men and women of 227.6 (SD=238.9) and 196.7 (SD=214.7) minutes respectively.

Table 4.1 Characteristics of participants in the *partnering*Healthy@Work survey of Tasmanian State Service employees conducted in 2010

	Men (n = 946)	Women (n = 2421)
Age (years), mean (Standard Deviation (SD))	47.0 (10.0)	45.8 (10.4)
Age group, % (n)		
<30 years	6.1% (58)	9.6% (233)
30-39 years	17.6% (166)	17.3% (418)
40-49 years	30.0% (284)	31.1% (754)
50-59 years	37.5% (355)	35.1% (850)
60+ years	8.8% (83)	6.9% (166)
Marital status, % (n)		
Married/living as married	83.3% (767)	74.2% (1755)
Separated/widowed/single	16.7% (154)	25.8% (609)
Education, % (n)		
≤ Year 12	17.2% (161)	22.0% (526)
Trade/certificate/diploma	30.1% (281)	23.7% (565)
University	28.5% (266)	31.6% (755)
Postgraduate	24.2% (226)	22.7% (543)
Work condition, % (n)		
Full-time work	84.8% (802)	50.8% (1229)
Part-time work	15.2% (144)	49.2% (1192)
Work category, % (n)		
Permanent	88.3% (835)	92.6% (2241)
Full time/casual	11.7% (111)	7.4% (180)
Physical functioning (SF-12 PCS score), mean (SD)	52.4 (6.8)	51.1 (8.6)
BMI (kg/m^2), mean (SD)	27.0 (4.4)	26.4 (5.4)
Weight status, % (n)		
Under/normal (BMI <25 kg/m^2)	35.3% (325)	47.7% (1041)
Overweight (BMI 25-29.9 kg/m^2)	45.7% (421)	29.9% (653)
Obese (BMI ≥30 kg/m^2)	19.1% (176)	22.3% (487)
Effort-Reward Imbalance (ERI), mean (SD)	0.44 (0.22)	0.45 (0.22)
Psychological distress (K10 total score), % (n)		
Low risk (10-16)	70.9% (663)	65.3% (1559)
Moderate risk (17-21)	19.1% (179)	23.6% (564)
High risk (22-29)	8.2% (77)	8.0% (191)
Very high risk (30-50)	1.7% (16)	3.1% (73)
Sitting at work (mins/day), mean (SD)	287.5 (151.2)	252.4 (161.8)
Leisure-time PA (mins/week), mean (SD)	227.6 (238.9)	196.7 (214.7)

4.4.2 Rank correlations between participant characteristics and psychological distress

Rank correlations of Kessler Psychological Distress Scale (K-10) scores with demographic, psychosocial, and work characteristics for men and women are shown in Table 4.2 below. Higher K-10 scores (greater psychological distress) were associated with younger age, greater occupational sitting, and less leisure time physical activity. The strongest correlations were with effort-reward imbalance. Marital status in a binary classification (married/living as married = 0, single/widowed/separated = 1) was positively associated with the K-10 scores (men r = 0.035, p=0.34; women r=0.057, p<0.01).

Table 4.2 Correlations of Kessler Psychological Distress Scale (K-10) scores with demographic and psychosocial factors for men and women

	Kessler Psychological Distress Scale	
	Men	Women
Age	–0.138***	–0.176***
Education	0.048	0.012
BMI	0.087*	0.026
Physical functioning (PCS score)	0.035	–0.005
Effort-Reward Imbalance	0.366***	0.384***
Sitting at work	0.093**	0.095***
Leisure-time PA	–0.070*	–0.078***

*** denotes p<0.001, ** denotes p<0.01, * denotes p<0.05

4.4.3 Multivariable associations between occupational sitting, leisure-time physical activity (LTPA) and psychological distress

Table 4.3 below provides estimated prevalence ratios for the moderate, high and very high categories of psychological distress. Model 1 estimates are adjusted for age, marital status and effort-reward imbalance, and Model 2 estimates are adjusted additionally for leisure-time physical activity. For each category, the ratios compare prevalence of psychological distress among those sitting 3–6 hours per day, and among those sitting more than 6 hours per day, relative to the prevalence of psychological distress among those sitting less than three hours per day at work. In Model 1, greater hours of occupational sitting were associated with higher prevalence of moderate psychological distress for men (p<0.01), and higher

prevalence of moderate (P<0.01) or high (p<0.001) psychological distress for women. The adjustments for age, marital status and effort-reward imbalance had the effect of increasing one or more of the prevalence ratios for moderate or high distress, and most substantially in the case of adjustment for effort-reward imbalance. No significant trends in prevalence of very high distress were found for either sex.

After additional adjustment for LPTA in Model 2, the associations of occupational sitting with prevalence of moderate psychological distress for men (p<0.01), and with prevalence of moderate (P<0.01) or high (p<0.01) psychological distress for women, remained statistically significant but somewhat reduced for women. Compared to those sitting at work less than 3 hours per day, men sitting more than 6 hours per day had 90 percent increased prevalence of moderate psychological distress (adjusted PR=1.90, 95%CI 1.22, 2.95), and women sitting more than six hours/day had 25 percent increased prevalence of moderate psychological distress (adjusted PR=1.25, 95%CI 1.05, 1.49) or 76% increased prevalence of high psychological distress (adjusted PR=1.76, 95%CI 1.25, 2.47). Again, no relationship was found between sitting at work and the prevalence of very high psychological distress among either men or women. Adjustment for education or self-reported physical functioning made little difference to the adjusted prevalence ratios, and covariates of these factors were not included in the final model. Adjustment for BMI slightly attenuated the prevalence ratios for each sex in the 'moderate' distress categories. For women, adjusting for BMI reduced the prevalence ratio for occupational sitting in the 'high' distress category, but the association remained significant (PR=1.61 (95%CI 1.13, 2.30). Given the minor nature of these changes, BMI was not included in the final modelling.

Table 4.3 Prevalence of psychological distress, and ratios of prevalence, for sitting at work among Tasmanian State Service employees in 2010

	Categories of psychological distress based on K-10 scores						
	Low	Moderate		High		Very high	
Model 1†	% (n/N)	% (n)	PR (95% CI)*	% (n)	PR (95% CI)*	% (n)	PR (95% CI)*
Sitting at work							
Men							
< 3 hrs/day	71.2 (158/222)	16.7 (37)	1.00	9.9 (22)	1.00	2.3 (5)	1.00
3–6 hrs/day	75.9 (179/236)	16.1 (38)	1.21 (0.74, 1.99)	5.9 (14)	0.97 (0.40, 2.39)	2.1 (5)	3.59 (0.15, 85.84)
> 6 hrs/day	67.3 (280/416)	23.3 (97)	1.81 (1.19, 2.78)	8.4 (35)	1.23 (0.61, 2.51)	1.0 (4)	0.82 (0.04, 18.74)
Trend			***p< 0.01***		*p= 0.50*		*p= 0.68*
Women							
< 3 hrs/day	69.1 (550/796)	21.4 (170	1.00	6.3 (50)	1.00 Ref	3.3 (26)	1.00 Ref
3–6 hrs/day	66.8 (375/561)	22.5 (126)	1.07 (0.88, 1.30)	8.2 (46)	1.48 (1.05, 2.10)	2.5 (14)	0.72 (0.41, 1.27)
> 6 hrs/day	61.8 (525/850)	25.9 (220)	1.27 (1.07, 1.52)	9.5 (81)	1.93 (1.37, 2.73)	2.8 (24)	1.13 (0.61, 2.10)
Trend			***p< 0.01***		***p< 0.001***		*p= 0.10*
Model 2‡							
Men							
< 3 hrs/day	71.2 (158/222)	16.7 (37)	1.00 Ref	9.9 (22)	1.00 Ref	2.3(5)	1.00 Ref
3–6 hrs/day	75.9 (179/236)	16.1 (38)	1.23 (0.74, 2.03)	5.9 (14)	0.97 (0.40, 2.40)	2.1(5)	3.44 (0.17, 70.62)
> 6 hrs/day	67.3 (280/416)	23.3 (97)	1.90 (1.22, 2.95)	8.4 (35)	1.23 (0.60, 2.54)	1.0(4)	0.77 (0.04, 14.84)
Trend			**p< *0.01***		*p= 0.52*		*p= 0.62*
Women							
< 3 hrs/day	69.1 (550/796)	21.4 (170)	1.00 Ref	6.3 (50)	1.00 Ref	3.3(26)	1.00 Ref
3–6 hrs/day	66.8 (375/561)	22.5 (126)	1.02 (0.83, 1.25)	8.2 (46)	1.18 (0.77, 1.79)	2.5(14)	0.40 (0.18, 0.90)
> 6 hrs/day	61.8 (525/850)	25.9 (220)	1.25 (1.05, 1.49)	9.5 (81)	1.76 (1.25, 2.47)	2.8(24)	1.01 (0.57, 1.80)
Trend			**p= *0.02***		***p< 0.01***		*p= 0.76*

*PR(95% CI) = prevalence ratio (95% confidence interval). Bold p values are statistically significant (p < 0.05). †Adjusted for age, marital status and effort-reward imbalance. ‡PR(95% CI) = prevalence ratio (95% confidence interval) adjusted for age, marital status, effort-reward imbalance and leisure-time physical activity

Two measures of physical health or functioning were tested in sensitivity analyses, with similar results in terms of the prevalence ratios for occupational sitting. One measure was the PCS score from the SF-12 which had a weak but significant inverse correlation to K10, and the other was the first question from the SF-12 which asks respondents to rate their health as poor, fair, good, very good, and excellent. Neither significantly changed the relationship observed for occupational sitting and psychological distress. Because the results for each were similar when tested in the models, the PCS score was used because it was felt to be a better discriminator of physical health.

Sensitivity analyses were performed with two additional K10 classification methods. Four-group analyses using classification based on Clinical Research Unit for Anxiety and Depression (CRUfAD) guidelines removed the association of sitting at work for men, but not for women (CRUfAD, 41). For women, compared to those sitting at work less than three hours/day, those sitting between three and six hours/day or more than six hours/day were more likely to fall into the category of experiencing a mild mental disorder (PR=1.50, 95%CI 1.06 2.14, $p<0.05$ and PR=1.38, 95%CI 0.98, 1.97, $p>0.05$, respectively). Further analyses, using a three-group 'Plain English' K10 categorisation (42), produced significant associations with prevalence of moderate symptoms of depression and/or anxiety (men, PR=1.61, 95%CI 1.16, 2.24, $p<0.01$, and women, PR=1.31, 95%CI 1.15, 1.50, $p<0.001$), for those who sat six or more hours/day relative to employees who sat less than three hours/day.

4.5 Discussion

This study examined occupational sitting and psychological distress in a cross-sectional sample of working adults, and found a relationship between sitting at work and moderate psychological distress for men and for women, moderate and high psychological distress, independent of leisure-time physical activity and work stress. While the results were contrary to an earlier study that found no relationship between mental health and sitting at work for either sex (19), the different results for women and men observed in the current study were consistent with Atkin and colleagues' (11) investigation of leisure-time sitting and mental well-being in employed adults. Atkin and co-workers reported associations between psychological

distress and TV-viewing, total non-occupational sitting time and computer use, whereas for men, a relationship was only observed for leisure-time computer use.

It is important to view the current findings with some caution. K10 total scores can be interpreted using a number of subtly differing clinical guidelines or recommendations that can vary according to context, population and reason for administering the K10. The cut points used in the current analysis to classify levels of psychological distress are those routinely used in Australian population-health surveys (35) and are drawn from the work of Andrew and Slade (43). The scores used to denote 'moderate' distress (K10 = 16/21) straddle definitions that alternately suggest a respondent may be at no or only mild risk of experiencing a diagnosable anxiety and/or depression related disorder. Moreover, the 'high' psychological distress categorisation (K10 = 22/29) overlaps descriptions that propose either a mild or moderate risk of a person having a current mental disorder (41, 43). Interpretation, therefore, is ultimately contingent on the K10 taxonomy referenced. This was highlighted using sensitivity analyses performed to determine the robustness of the current findings across differing scoring methods. For men, the relationship between occupational sitting and mild or moderate distress observed in the current study was obscured using the CRUfAD alternate scoring method, but not when using the three-category 'Plain English' technique. For women sitting for six or more hours at work, associations between mild or moderate depression and/or anxiety symptoms and sitting at work persisted, regardless of the K10 scoring method used.

No consistent relationship was observed in the present study for either sex with 'very high' psychological distress, a category that signifies across all scoring methods that a person is likely to be experiencing distress associated with a severe mental disorder. Those in this 'very high' category are likely to face stressors that overshadow any potential association with work-related sedentariness. It could also be argued that respondents classified as moderately distressed are unlikely to present with a clinically relevant mental health concern that compels direct intervention, privately or in the workplace. Yet, a concern remains that moderate unremitting psychological distress heightens the risk of worsening mental health

(44), and sub threshold depression is associated with worse work functioning and poorer quality of life in comparison to people without any depressive symptoms (45). Given the prevalence of sedentariness in many work roles, even small increases in the risk of psychological distress suggest these present findings may be of public health significance.

Similar to Atkin and colleagues (11), women in the present study showed higher risks of reporting psychological distress associated with occupational sitting than men. Generally, women are more likely to report more distress than men (34), and a debate endures questioning if this is due to sex-related differences in reporting of mental health concerns. While the mechanisms and direction of the relationships underlying associations between mental health and sedentary behaviours are currently poorly understood, a number of pathways might explain the current results, and the observed sex difference. First, occupational sitting may displace mental health promoting physical activity. Work-related tasks such as driving or desk-bound duties tend to dictate the duration and patterns of employee sitting, and can restrict opportunities for incidental activity. Women may be more susceptible to the displacement of lighter-intensity or ambulatory activity, a hypothesis supported by previous research demonstrating that walking, and not moderate or vigorous activity has been associated with greater odds of emotional well-being for women only (46). An alternative explanation can be drawn from research demonstrating that the context in which physical activity occurs can have differing mental health implications, particularly for women (17, 47). Similarly, context may be important for sedentary behaviours (16). In addition, gender-moderated disparities are often evident in work type and work patterns. Since men and women in our sample reported similar estimations of work stress, unmeasured factors such as work-family conflict and incorporation of work and parenting roles could be differentially affecting women (48, 49), however these factors were outside the scope of our investigation.

The current study had several limitations. Our occupational sitting measure was developed and used in 2010, when validated workplace sitting measures were not widely available. While the psychometric properties of our sitting time measure are

unknown, it is comparable to the validated brief, self-reported measure of Clark and colleagues (37). Further, objective measurement of sitting and physical activity was not practicable within the scope of the research. Since data collected were self-reported, recall and response bias may be evident. To mitigate response bias, data was weighted for non-response. In addition, the potential for residual confounding exists, whereby measurement error or unmeasured factors associated with both sitting time and psychological distress may account for the observed associations. For example, constructs such as social support, social mobility and social status, which may moderate the relationship between depression and sedentary behavior (50), were not collected in the current research. Nevertheless, work stress was included in the modeling to account for psychosocial confounding that may have arisen as a consequence of jobs with poor effort-reward balance being more likely to be sedentary and stressful. Given the diversity of occupations within the public sector population under investigation, it was determined that respondents' own appraisals of their immediate work environment, and the degree to which various factors caused distress, provided the best data available with which to assess work stress as a possible confounder. Finally, a temporal relationship between occupational sitting and psychological distress cannot be ascertained due to the cross-sectional survey design. Further prospective investigations are needed to confirm these early findings into sedentary behaviours and mental health in the work environment, and to consolidate the focus on sedentariness as the 'new workplace health priority' (26) in work environments that encourage or command sustained and often unbroken periods of sitting.

4.6 Conclusion

Prolonged sitting, a potentially modifiable behaviour, has established adverse implications for physical health. Our study found a significant association between prolonged sitting at work and intermediate levels of psychological distress, notwithstanding there was no consistent relationship observed for very high distress. Due to low numbers of men in the very high distress category, the ability to draw strong conclusions about this group and occupational sitting is limited. However, women in this latter category may be experiencing stressors that

overshadow any potential weaker association with occupational sitting. While further prospective research is required before causal inferences can be drawn, these findings contribute to the emerging literature researching the independent health outcomes associated with sedentary behaviours.

4.7 Postscript

The results of the last two chapters used data from the 2010 *partnering*Healthy@Work (*p*H@W) survey to two elements that were important to Healthy@Work: commonly used implementation strategies and sitting at work. The remaining chapters investigate activity implementation and outcomes after three years of Healthy@Work. The findings presented in the following chapter explore the reach and uptake of Healthy@Work activities, using data from the 2013 *p*H@W survey.

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Chapter 5

Factors associated with availability of, and employee participation in, comprehensive workplace health promotion (WHP) in a large and diverse Australian public-sector setting: a cross-sectional survey

Chapter 5. Factors associated with availability of, and employee participation in, comprehensive workplace health promotion (WHP) in a large and diverse Australian public-sector setting: a cross-sectional survey

5.1 Preface

Understanding the reach (activity availability) and uptake (participation) for a program of the scale of Healthy@Work can assist in the interpretation of employee health outcomes, and highlights areas requiring attention for future programs. This chapter aims to examine activity availability and participation for Healthy@Work across a range of individual and organisational factors.

5.2 Introduction

Lifestyle factors such as cigarette smoking, physical inactivity, sedentariness, poor diet, risky alcohol consumption, and overweight and obesity, are associated with the development of many non-communicable diseases including cardiovascular disease, some cancers, type 2 diabetes (1, 2), and a higher mortality risk (3). The workplace is an important health promotion setting (4-14), but the success of activities designed to promote healthy lifestyle behaviours via the workplace is largely contingent upon the engagement of employees, particularly those most at risk of poor health (15). Numerous factors may effect employee engagement, including variable or selective engagement with activities (16-18) subject to an individual's sex, age, physical or mental health status, or current health-related behaviours (16, 19, 20). Work-related factors, including work type and patterns, and employment conditions, exert further influence (21). Importantly, inconsistencies in workplace health promotion (WHP) outcomes may be explained by discrepancies in actual or perceived availability of activities (21).

There are inherent challenges involved in delivering programs with equitable access to WHP in large and diverse employee populations across multiple worksites and occupations. Determining employee awareness of programs provides an important indicator of program reach. Disparities in reported availability across individual and organisational factors can highlight deficiencies in program communication or

implementation strategies (22), as well as help to explain participation variability and program outcomes (21), yet relatively little is known about activity availability and participation within such organisations, or in employee populations outside of the USA. Moreover, pragmatic real-world investigations of health promotion programs are increasingly being sought, particularly for programs that attempt to provide comprehensive WHP on a large scale utilising a solid foundation of best-evidence strategies (23, 24). Therefore, the aim of this study was to investigate individual, work and organisational factors associated with employee perceived availability of and participation in comprehensive workplace health promotion programs in a large public-sector population.

5.3 Methods

Study population

Tasmania is a state of Australia with a population of approximately 500,000 people. The Tasmanian State Service (TSS) employs close to 30,000 employees in a range of occupations, state government departments or agencies (including education, health, police, forestry, tourism, treasury and the arts), job types (blue and white collar, service, administration etc.), locations (metropolitan, rural, or remote), across approximately 1,500 worksites. In 2009, the TSS allocated more than AU$2,000,000 over four years to support the implementation of WHP across its whole workforce, a commitment consolidated by a government directive that all departments must establish a Healthy@Work WHP program. The overarching aim of Healthy@Work was to integrate well-developed and effective workplace health and wellbeing programs integrated within each Tasmanian State Service agency, with a further objective to improve the health and wellbeing of employees. The programs were to address cultural, environmental, policy, and procedural aspects of the work environment that affect employee health, as well as providing access to WHP activities targeting health and health behaviours.

Within each department/agency a comprehensive health promotion approach was to integrate best-practice elements (25): shared organisational goals; leadership support; establishment of a coordination mechanism that included workplace health committees, and an affiliation with existing occupational health and safety

frameworks; needs assessments that informed action plans that detailed program goals and objectives, strategies to achieve these, identification of resources, facilities and relevant expertise; implementation plans; and routine monitoring and evaluation of programs. A key element of the overarching strategic plan was to ensure equitable access to a broad array of activities focussing on key health-related behaviours and stress (26). The WHP activities employees were supported to access ranged broadly from nationally available resources such as telephone-based health coaching (27) and smoking cessation supports, fitness challenges and employee assistance programs (28), to localised activities tailored to site- and employee-specific needs. By training key department personnel and supporting each department to apply an evidence-based implementation process, the ultimate goal was to embed within departments knowledge and programs that would persist beyond the initial funding period.

This study used cross-sectional data collected in 2013 as part of *partnering*Healthy@Work, a collaboration between the TSS and researchers at the University of Tasmania. The aim of the partnership was to evaluate the health and economic outcomes and extend the policy and research implications of Healthy@Work. Stratified random sampling was undertaken from a sampling frame encompassing all TSS employees. Stratification was by government agency, employment condition (permanent, casual/fixed term) and employment category (full-time, part-time). Written, informed consent was obtained and the research had ethical approval from the Human Research Ethics Committee (Tasmania), reference no. H0010501.

5.3.1 Measures

Socio demographic and work characteristics

Self-report data from the 2013 *partnering*Healthy@Work survey were merged with administrative data from the TSS human resources database. Assessed characteristics included age, sex, self-reported level of education and marital status, employment condition, employment category, annual salary, occupation type (manager, blue collar, white collar, service, professional), the government

department/agency in which an employee worked and the number of worksites per department.

Health and health-related behaviours

The measures used to collect data on health and health-related behaviours have been described in a previous publication (29). In summary, self-reported health status was assessed using the first item of the Short-Form Health Survey (SF-12) (30). This item asks respondents to rate their how their health is, generally, on a 5-point Likert-type scale that ranges from excellent to poor health. Physical activity and time spent in sedentary behaviours were estimated using the long form International Physical Activity Questionnaire (IPAQ) (31). An additional question in the style of the IPAQ, and similar to other validated population-based occupational sitting measures (32, 33), asked respondents to estimate the total time spent sitting at their workplace during a typical work day, including meal and snack breaks. Diet was assessed using cup-equivalents of daily vegetable (excluding potatoes) and fruit intake (34), and the three-item Alcohol Use Disorders Identification Test (AUDIT-C) was used to estimate alcohol intake (35). The AUDIT-C total scores ranged from 0 – 12, with higher scores indicating a higher risk of risky drinking. Respondents were categorised as current smokers or non-smokers (combining ex-smokers and never-smokers). Body mass index (BMI) was calculated as weight (kg)/height^2(m) from self-reported weight and height. Weight status was categorised as underweight/normal (BMI<25kg/m^2), overweight (25≤BMI<30kg/m^2) or obese (BMI≥30kg/m^2).

Workplace health promotion activities related to health behaviours

Respondents indicated which types of health and wellbeing activities were available to them (yes/no) and whether they participated in each type during the previous three years (yes/no), during which time Healthy@Work had been implemented. Activity types included education, health assessments, physical activity, mental health, ‘walk and talk’ active meetings, flu vaccination, smoking cessation, interrupted sitting programs, subsidised membership to off-site facilities or programs and health and wellbeing activities facilitated by the organisation. In this study we were interested in activities related to health behaviours due to the association between adverse lifestyle factors and non-communicable chronic

diseases. Available activities and participation data were therefore restricted for the current analyses to activity types that could be mapped to health behaviours (SNAPS-related: smoking, nutrition, alcohol, physical activity and sedentariness). We were interested in the breadth of activities made available, and participated in, as a key element of comprehensive WHP is to target multiple aspects of health and wellbeing (25, 36). Subjective SNAPS-related activity availability ranged from 0 – 8 activity types, and reported participation in activity types ranged from 0 – 7. Participation data was restricted to respondents who reported that at least one activity had been available to them.

5.3.2 Statistical analysis

Descriptive statistics are reported using unweighted proportions, or means and standard deviations (SD). For the analyses in Table 5.2 and Table 5.3 below, negative binomial regression (for availability) and Poisson regression (for participation) were used to estimate the likelihood of reported activity availability or participation according to each factor. Analyses for reported availability of activities by each factor under investigation were adjusted for age, sex and work schedule (except when the adjusting variables were the outcome under investigation, in which case the outcome factor was adjusted for the remaining two adjustment variables). Similarly, reported participation analyses were adjusted for age, sex, work schedule, and reported availability of activities. Covariates were included in the final models if inclusion increased model fit, as assessed by a Wald test, or produced a change greater than 10% (37) in the coefficient of the covariate for the facilitator or barrier. Non-missing data were weighted using inverse probability of response to address possible response bias (38, 39). In brief, the probability of response was estimated using a logistic regression model that included binary covariates for the stratification factors (work category, employment contract, government agency) and covariates for the other characteristics (sex, age, employment duration). Respondents and non-respondents were compared based on known sampling characteristics. For analyses, weights derived using the inverse probability of response were applied to data from survey recipients who did respond, to account for non-response from other survey recipients (who are therefore underrepresented in the data). Inverse probability

weighting thus allows inferences to be drawn for the initially sampled population. Ratios of prevalence (PR) and 95% confidence intervals (CI) are reported. All analyses were conducted using Stata, version 12, and a two-sided probability value of $p<0.05$ was used to assess statistical significance.

5.4 Results

5.4.1 Participant characteristics

The socio-demographic, health and work characteristics of survey respondents are shown in Table 5.1 below. The survey was completed by 26.9% (3,228/12,008) of the eligible selected sample of Tasmanian State Service employees. Respondents were predominantly female (71.6%), had a mean age of 47.0 (standard deviation (SD) = 10.3) years, an annual average income of AU$73,525 (SD = $26, 048), and BMI of 26.7 kg/m^2 (SD = 5.3). The minority were current smokers (9.0%). On average, respondents reported less than 1.8 serves of fruit per day (SD = 0.9) and 2.8 serves of vegetables per day (SD = 1.3). Two sample tests of proportions showed no significant differences were found when socio-demographic data were compared for all survey respondents against those respondents who had complete data for availability and participation. Respondents were comparable to all state service employees for all available data. For example, 30.0% of state service employees were male, compared to 28.4% of respondents, and 85.2% of employees were permanently employed, compared to 87.4% of respondents (40).

Table 5.1 Characteristics of participants in the *partnering*Healthy@Work survey of Tasmanian State Service employees conducted in 2013

	N = 3228
Sex (male), % (n)	28.4 (917)
Age (years), mean (Standard Deviation (SD))	47.0 (10.3)
Annual income (AU$), mean (SD)	
Respondent average income	$73,525 ($26,048)
National average ordinary-time income (2013)	$73,980† NA
Smoking status	
Never	64.5 (2072)
Ex-daily	26.6 (854)
Current	9.0 (288)
Daily fruit intake (cup equivalent), mean (SD)	1.8 (0.9)
Daily vegetable (cup equivalent), mean (SD)	2.8 (1.3)
Alcohol consumption	
Frequency of drinking alcohol, % (n)	
Never/monthly or less	28.8 (926)
2-4 times a month	23.2 (744)
2-3 times a week	27.1 (871)
4 or more times a week	20.9 (670)
Number of standard drinks on typical day, % (n)	
1 or 2	65.3 (1840)
3 or 4	24.7 (696)
5 or more	10.0 (283)
BMI (kg/m^2), mean (SD)	26.7 (5.3)
Number of self-reported chronic health conditions	
Cardio metabolic-related, mean (SD)	0.3 (0.6)
Respiratory-related, mean (SD)	0.1 (0.3)
Leisure-time PA (mins/week), mean (SD)	205.9 (228.8)
Leisure-time PA (mins/week), median (IQR)	142.8 (40 - 300)
Sitting at work (mins/typical day), mean (SD)	270.9 (154.0)
Sitting at work (mins/typical day), median (IQR)	300 (120 – 420)
SNAPS-related* activities perceived available, mean (SD)	2.1 (1.8)
Participation in SNAPS-related* activities, mean (SD)	1.3 (1.1)

*WHP activities defined as SNAPs-related if the activities related to education, health assessments, physical activity, smoking, interrupted sitting, subsidised membership to off-site facilities or programs, and regular health and wellbeing activities facilitated by the organisation. †Australian Bureau of Statistics, 2013.

The proportions of activity types reported by respondents to be available to them, and the proportions of respondents overall who participated in each type, if available, in the three years prior to survey completion in 2013 are presented in Figure 5.1 below. Physical activity (60%) and education programs (47%) were the most common activity types reported available. Of the activities that were reported available, the highest proportions of participation were for physical activity, health

assessments and education programs (33%, 12%, 28%, respectively, reported participation if the corresponding activity type was available).

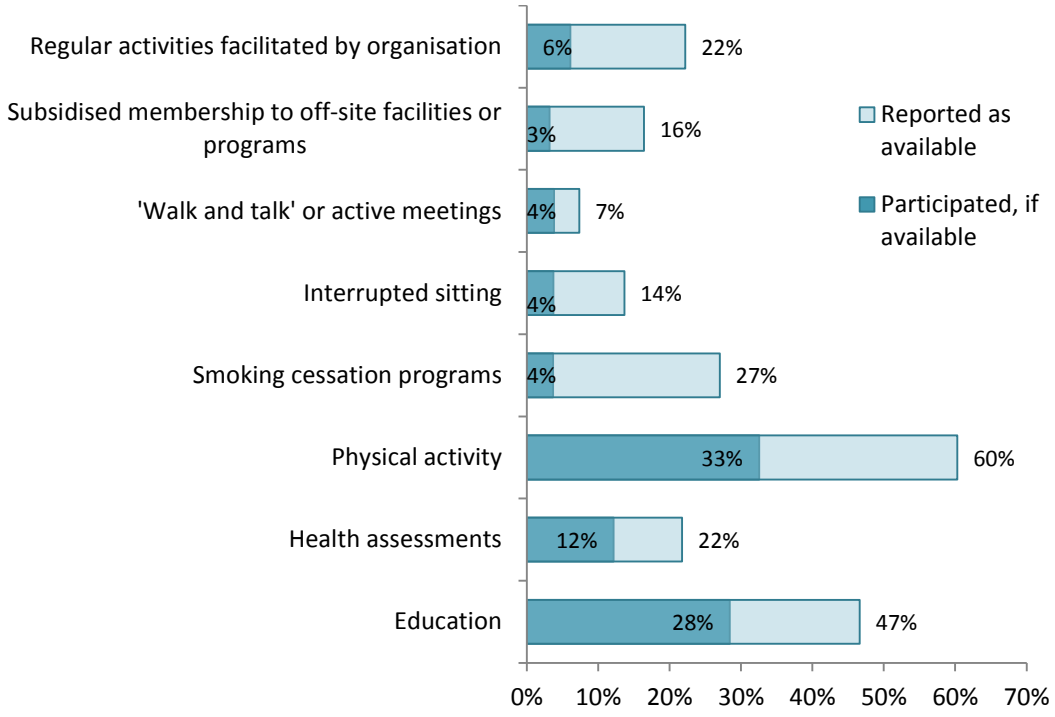

Figure 5.1 The proportions of the types of workplace health promotion activities that respondents reported were available to them, and the proportions of all respondents who participated (yes/no) in an activity type (if it was reported available)

Ratios of prevalence of perceived availability of, and reported participation in, SNAPS-related WHP activities, for demographic factors, health and health related behaviours are reported in Table 5.2 below. In adjusted models, women were significantly less likely than men to perceive more activities were available to them (PR=0.86, 95%CI 0.81 0.94). A marked trend was observed with increasing age and a reduced likelihood of perceiving more available activities (trend: p<0.001), where all prevalence ratios were significant and decreased with every increase in age group, compared to respondents under 30 years old. All employees with an education level higher than year 12 were significantly more likely to perceive more activities available to them. For example, those with post-graduate qualifications were 28% more likely to report more available activity types (PR = 1.32, 95%CI 1.20, 1.46), compared to respondents with school education only. Respondents with a higher likelihood of reporting greater perceived activity availability were those reporting any leisure time physical activity (LTPA) (0<150 minutes/week: PR=1.18, 95%CI 1.08,

1.30 and ≥150 minutes/week: PR=1.17, 95%CI 1.07, 1.28) and those sitting at work more than three hours on a typical day (3<6hrs/day: PR=1.25, 95%CI 1.14, 1.37 and ≥ 6hrs/day: PR=1.50, 95%CI 1.39, 1.62), compared with respondents reporting no LTPA or less than three hours sitting at work, respectively.

Of all the socio-demographic and health variables in Table 5.2, following adjustment for covariates and availability of programs, respondents reporting any LTPA had a significantly increased likelihood of participating in SNAPS-related activities, compared to respondents reporting no LTPA ($p < 0.01$). A significant trend was observed for age and participation (trend: $p<0.01$), and respondents aged between 50 and 59 were 15% more likely to report participation, compared to the reference group (PR=1.15, 95%CI 1.04, 1.33). Respondents reporting one or more cardio metabolic conditions and current smokers were 11% (PR=0.89, 95% 0.82, 0.97) and 16% (PR=0.84, 95% 0.72, 0.97) less likely to participate in more activity types, respectively, compared to their corresponding reference categories.

Ratios of prevalence for perceived availability of and reported participation in SNAPS-related WHP activities for work-related and organisational factors and levels of activity are reported in Table 5.3 below. Compared to blue-collar workers, managers and administrative staff were more likely to report activity types were available to them (PR=1.64, 95%CI 1.45, 1.85 and PR=1.22, 95%CI 1.10, 1.35), after adjustment for covariates. Likewise, a significant trend was observed for annual income and reported availability of activities (trend: $p<0.001$). Respondents earning more than $85,000 per annum were 62% more likely to report more activity availability than those earning less than $55,000 (PR=1.62, 95%CI 1.46, 1.79).

Table 5.2 Ratios of prevalence of reported availability of and participation in SNAPs-related* WHP activities, for demographic factors, health, and health-related behaviours

	WHP activity availability (~N=3159)					WHP activity participation (~N=2185)				
		Unadjusted		Adjusted†			Unadjusted		Adjusted‡	
	(n)	PR	(95% CI)¶	PR	(95% CI)¶	(n)	PR	(95% CI)¶	PR	(95% CI)¶
Sex										
Male	(901)	1.00	Ref	1.00	Ref	(646)	1.00	Ref	1.00	Ref
Female	(2258)	**0.86**	**(0.80, 0.92)**	**0.87**	**(0.81, 0.94)**	(1539)	0.95	(0.88, 1.03)	1.06	(0.99, 1.15)
diff		*p*	***< 0.001***	*p*	***< 0.001***		*p*	*= 0.23*	*p*	*= 0.10*
Age										
<30	(225)	1.00	Ref	1.00	Ref	(180)	1.00		1.00	Ref
30-39	(524)	**0.84**	**(0.74, 0.96)**	**0.85**	**(0.75, 0.97)**	(356)	0.97	(0.82, 1.14)	1.04	(0.90, 1.20)
40-49	(895)	**0.80**	**(0.71, 0.90)**	**0.80**	**(0.71, 0.90)**	(645)	0.98	(0.84, 1.14)	1.08	(0.97, 1.25)
50-59	(1251)	**0.72**	**(0.64, 0.81)**	**0.72**	**(0.64, 0.81)**	(834)	1.01	(0.87, 1.17)	**1.15**	**(1.04, 1.33)**
60+	(264)	**0.60**	**(0.51, 0.71)**	**0.60**	**(0.51, 0.70)**	(170)	0.90	(0.75, 1.08)	**1.17**	**(1.00, 1.37)**
trend		***p***	***< 0.001***	***p***	***< 0.001***		*p*	*= 0.88*	***p***	***< 0.01***
Education										
≤Year 12	(593)	1.00	Ref	1.00	Ref	(351)	1.00	Ref	1.00	Ref
Trade/certificate/Diploma	(840)	**1.20**	**(1.08, 1.37)**	**1.18**	**(1.07, 1.31)**	(576)	1.03	(0.92, 1.17)	1.02	(0.92, 1.13)
University	(1003)	**1.27**	**(1.15, 1.40)**	**1.20**	**(1.09, 1.33)**	(715)	1.01	(0.89, 1.13)	0.99	(0.89, 1.10)
Postgraduate	(719)	**1.37**	**(1.24, 1.52)**	**1.32**	**(1.20, 1.46)**	(540)	1.02	(0.90, 1.15)	0.95	(0.85, 1.06)
diff		***p***	***< 0.001***	***p***	***< 0.001***		*p*	*= 0.95*	*p*	*= 0.42*
Marital status										
Married/living as married	(2427)	1.00	Ref	1.00	Ref	(1675)	1.00	Ref	1.00	Ref
Separated/widowed/single	(720)	1.00	(0.93, 1.08)	0.99	(0.92, 1.06)	(501)	0.96	(0.88, 1.05)	0.95	(0.87, 1.04)
trend		*p*	*= 0.98*	*p*	*= 0.73*		*p*	*= 0.42*	*p*	*= 0.28*
Self-rated health										
Good/very good/excellent	(2761)	1.00	Ref	1.00	Ref	(1926)	1.00	Ref	1.00	Ref
Poor/fair	(393)	0.91	(0.83, 1.00)	0.92	(0.84, 1.01)	(257)	0.95	(0.85, 1.06)	0.99	(0.90, 1.10)
diff		*p*	*= 0.06*	*p*	*= 0.09*		*p*	*= 0.34*	*p*	*= 0.99*

Chronic health conditions											
Cardio metabolic§											
None reported		(2358)	1.00	Ref	1.00	Ref	(1659)	1.00	Ref	1.00	Ref
One or more reported		(692)	**0.90**	**(0.83, 0.97)**	0.96	(0.88, 1.04)	(455)	**0.90**	**(0.82, 0.99)**	**0.89**	**(0.82, 0.97)**
	trend		***p***	***< 0.01***	*p*	*= 0.30*		***p***	***= 0.02***	***p***	***= 0.04***
Respiratory#											
None reported		(2686)	1.00	Ref	1.00	Ref	(1878)	1.00	Ref	1.00	Ref
One or more reported		(325)	0.95	(0.86, 1.06)	0.93	(0.83, 1.03)	(216)	0.97	(0.86, 1.10)	0.99	(0.88, 1.10)
	trend		*p*	*= 0.36*	*p*	*= 0.15*		*p*	*= 0.67*	*p*	*= 0.83*
Leisure-time physical activity											
None reported		(590)	1.00	Ref	1.00	Ref	(376)	1.00	Ref	1.00	Ref
0< 150 mins/week		(994)	**1.21**	**(1.10, 1.33)**	**1.18**	**(1.08, 1.30)**	(701)	**1.20**	**(1.07, 1.34)**	**1.13**	**(1.03, 1.25)**
≥ 150 mins/week		(1569)	**1.22**	**(1.12, 1.34)**	**1.17**	**(1.07, 1.28)**	(1106)	**1.27**	**(1.15, 1.41)**	**1.18**	**(1.08, 1.29)**
	trend		***p***	***< 0.001***	***p***	***< 0.01***		***p***	***< 0.001***	***p***	***< 0.01***
Sitting at work											
<3hrs/day		(945)	1.00	Ref	1.00	Ref	(580)	1.00	Ref	1.00	Ref
3<6hrs/day		(820)	**1.26**	**(1.15, 1.38)**	**1.25**	**(1.14, 1.37)**	(560)	1.08	(0.98, 1.20)	0.96	(0.86, 1.07)
≥ 6hrs/day		(1364)	**1.55**	**(1.43, 1.67)**	**1.50**	**(1.39, 1.62)**	(1027)	**1.15**	**(1.06, 1.26)**	0.93	(0.84, 1.02)
	trend		***p***	***< 0.001***	***p***	***< 0.001***		***p***	***<0.01***	*p*	*= 0.06*
Weight status (BMI= kg/m^2)											
Under/Normal: BMI<25		(1241)	1.00	Ref	1.00	Ref	(854)	1.00	Ref	1.00	Ref
Overweight: BMI≥25-<30		(989)	0.99	(0.92, 1.07)	1.00	(0.93, 1.08)	(716)	1.00	(0.91, 1.09)	1.00	(0.92, 1.08)
Obese: BMI≥30		(636)	**0.85**	**(0.78, 0.93)**	**0.87**	**(0.80, 0.95)**	(421)	0.93	(0.84, 1.02)	0.98	(0.90, 1.07)
	trend		***p***	***< 0.01***	***p***	***< 0.01***		*p*	*= 0.17*	*p*	*= 0.72*
Alcohol consumption											
Meets guidelines		(1644)	1.00	Ref	1.00	Ref	(1120)	1.00	Ref	1.00	Ref
Exceeds guidelines		(1443)	**1.12**	**(1.05, 1.20)**	1.05	(0.98, 1.12)	(1015)	1.06	(0.98, 1.14)	1.00	(0.94, 1.07)
	trend		***p***	***< 0.01***	*p*	*= 0.16*		*p*	*= 0.12*	*p*	*= 0.93*
Smoking											
Never smoker/ex-daily		(3072)	1.00	Ref	1.00	Ref	(2004)	1.00	Ref	1.00	Ref
Current smoker		(277)	0.96	(0.86, 1.08)	0.98	(0.88, 1.10)	(175)	**0.87**	**(0.75, 0.99)**	**0.84**	**(0.72, 0.97)**
	trend		*p*	*= 0.51*	*p*	*= 0.79*		***p***	***= 0.04***	***p***	***= 0.02***

Fruit and vegetable intake										
Meets guidelines	(228)	1.00	Ref	1.00	Ref	(168)	1.00	Ref	1.00	Ref
Lower than guidelines	(2927)	1.01	(0.90, 1.13)	0.94	(0.84, 1.06)	(2015)	0.90	(0.80, 1.04)	0.90	(0.78, 1.02)
trend		*p*	*= 0.86*	*p*	*= 0.33*		*p*	*= 0.15*	*p*	*= 0.09*

*WHP activities defined as SNAPs-related if the activities related to education, health assessments, physical activity, smoking, interrupted sitting, subsidised membership to off-site facilities or programs, and regular health and wellbeing activities facilitated by the organisation. †Adjusted for sex, age and work schedule, when not a key factor. ‡Adjusted for sex, age, work schedule (when not a key factor) and number of SNAPs-related WHP programs reported by employees to be available. ¶PR(95% CI) = prevalence ratio (95% confidence interval). §Cardio metabolic health conditions: high blood pressure or hypertension, congestive heart failure, coronary heart disease, diabetes, high blood cholesterol. #Respiratory chronic health conditions: chronic obstructive pulmonary disease, asthma, bronchitis.

Table 5.3 Ratios of prevalence of employee-reported availability of and participation in SNAPs-related* WHP activities, for work and organisational factors

		WHP activity availability (~N=3159)					WHP activity participation (~N=2185)				
			Unadjusted		Adjusted†			Unadjusted		Adjusted‡	
		(n)	PR	(95% CI)¶	PR	(95% CI)¶	(n)	PR	(95% CI)¶	PR	(95% CI)¶
Annual income											
<$55000		(740)	1.00	Ref	1.00	Ref	(449)	1.00	Ref	1.00	Ref
$55000 - $64999		(438)	**1.30**	**(1.16, 1.45)**	**1.21**	**(1.09, 1.35)**	(298)	0.98	(0.86, 1.11)	**0.88**	**(0.79, 0.98)**
$65000 - $74999		(624)	**1.39**	**(1.26, 1.54)**	**1.39**	**(1.26, 1.53)**	(459)	0.96	(0.86, 1.07)	**0.86**	**(0.78, 0.95)**
$75000 - $84999		(721)	1.09	(0.98, 1.21)	1.08	(0.97, 1.20)	(485)	0.91	(0.82, 1.02)	**0.89**	**(0.81, 0.98)**
>$85000		(636)	**1.63**	**(1.48, 1.80)**	**1.62**	**(1.46, 1.79)**	(494)	1.10	(0.99, 1.23)	**0.85**	**(0.77, 0.93)**
	trend		***p***	***< 0.001***	***p***	***< 0.001***		*p*	*= 0.34*	*p*	*= 0.06*
Occupation type											
Blue collar		(315)	1.00	Ref	1.00	Ref	(258)	1.00	Ref	1.00	Ref
Manager		(509)	**1.62**	**(1.45, 1.83)**	**1.64**	**(1.45, 1.85)**	(308)	**1.37**	**(1.20, 1.57)**	1.10	(0.97, 1.24)
Administration		(945)	**1.21**	**(1.10, 1.35)**	**1.22**	**(1.10, 1.35)**	(661)	**1.21**	**(1.08, 1.37)**	**1.14**	**(1.02, 1.26)**
Service		(1282)	1.09	(0.98, 1.20)	1.10	(0.99, 1.21)	(878)	0.99	(0.88, 1.12)	1.05	(0.95, 1.17)
Professional		(174)	1.14	(0.90, 1.44)	1.07	(0.85, 1.37)	(52)	0.94	(0.70, 1.26)	0.92	(0.70, 1.22)
	diff		*p*	*= 0.36*	*p*	*= 0.74*		***p***	***= 0.02***	*p*	*= 0.46*
Work condition											
Full-time work		(1842)	1.00	Ref	1.00	Ref	(1321)	1.00	Ref	1.00	Ref
Part-time work		(1317)	**0.81**	**(0.76, 0.87)**	**0.88**	**(0.81, 0.96)**	(864)	**0.86**	**(0.80, 0.92)**	1.00	(0.91, 1.09)
	diff		***p***	***< 0.001***	***p***	***< 0.01***		***p***	***< 0.001***	*p*	*= 0.94*
Work category											
Permanent		(2770)	1.00	Ref	1.00	Ref	(1918)	1.00	Ref	1.00	Ref
Fixed term/casual		(389)	0.98	(0.88, 1.08)	0.93	(0.85, 1.03)	(267)	0.93	(0.83, 1.05)	0.94	(0.83, 1.05)
	diff		*p*	*= 0.68*	*p*	*= 0.17*		*p*	*= 0.25*	*p*	*= 0.27*
Work schedule											
Monday-Friday		(1818)	1.00	Ref	1.00	Ref	(1307)	1.00	Ref	1.00	Ref
Days vary/Other		(1333)	0.96	(0.87, 1.04)	**0.88**	**(0.83, 0.94)**	(873)	**0.83**	**(0.75, 0.91)**	**0.84**	**(0.76, 0.90)**
	diff		*p*	*= 0.32*	***p***	***< 0.001***		***p***	***< 0.001***	***p***	***< 0.001***

Government Agency										
All other	(946)	1.00	Ref	1.00	Ref	(753)	1.00	Ref	1.00	Ref
Health	(1155)	**0.81**	**(0.76, 0.87)**	**0.84**	**(0.78, 0.90)**	(826)	**0.74**	**(0.68, 0.80)**	**0.85**	**(0.79, 0.92)**
Education	(1058)	**0.40**	**(0.36, 0.43)**	**0.40**	**(0.37, 0.44)**	(601)	**0.70**	**(0.63, 0.75)**	**1.10**	**(1.01, 1.20)**
diff		***p***	***< 0.001***	***p***	***< 0.001***		***p***	***< 0.001***	*p*	*=0.34*
No. of work-sites										
1-5	(141)	1.00	Ref	1.00	Ref	(124)	1.00	Ref	1.00	Ref
6-50	(407)	**0.88**	**(0.80, 0.97)**	**0.90**	**(0.82, 0.99)**	(328)	0.99	(0.85, 1.16)	0.98	(0.86, 1.13)
51-199	(398)	**0.74**	**(0.67, 0.82)**	**0.76**	**(0.68, 0.84)**	(301)	**0.84**	**(0.91, 0.99)**	0.95	(0.82, 1.10)
200+	(2213)	**0.50**	**(0.46, 0.54)**	**0.53**	**(0.48, 0.57)**	(1432)	**0.66**	**(0.57, 0.76)**	0.90	(0.79, 1.02)
trend		***p***	***< 0.001***	***p***	***< 0.001***		***p***	***< 0.001***	*p*	*= 0.06*

*WHP activities defined as SNAPs-related if the activities related to education, health assessments, physical activity, smoking, interrupted sitting, subsidised membership to off-site facilities or programs, and regular health and wellbeing activities facilitated by the organisation. †Adjusted for sex, age and work schedule, when not a key factor. ‡Adjusted for sex, age, work schedule (when not a key factor) and number of SNAPs-related WHP programs reported by employees to be available. ¶PR(95% CI) = prevalence ratio (95% confidence interval).

Part-time workers were 12% less likely to report more activity types available to them than full-time workers (PR=0.88, 95%CI 0.81, 0.96). In contrast to all other government agencies grouped together, the employees from the two largest agencies, the Department of Health and Human Services and the Department of Education, were 16% and 60% less likely to report more activities available, respectively, (PR=0.84, 95%CI 0.78, 0.90 and PR=0.40, 95%CI 0.37, 0.44). Similarly, the more worksites within an agency, the less likely employees were to be report more activity types available (trend: $p<0.001$). For example, employees in agencies with between 51 and 199 worksites (this does not include health and education) were 24% less likely to report more activity availability (PR=0.76, 95%CI 0.68, 0.84).

With regard to the number of SNAPS-related activity types in which respondents participated, and following adjustment for age, sex, work schedule and reported activity availability, those earning over $85,000 were 15% less likely to report participation in different activities (PR=0.85, 95%CI 0.77, 0.93), compared with respondents earning less than $55,000. Administrative staff were more likely to participate, compared to blue-collar workers (PR=1.14, 95%CI 1.02, 1.26). Last, compared to the reference category, employees from the Department of Health and Human Services (PR=0.85, 95%CI 0.79, 0.92) were less likely to participate in contrast to employees from the Education department who were more likely, after additional adjustment for availability (PR=1.10, 95%CI 1.01, 1.20).

No interactions were found between program availability and any of the factors. Participation analyses included data from respondents who had reported at least one activity type was available to them. Therefore, 669 respondents who reported no activities were available were not included in participation analyses. Sensitivity analyses were performed where participation analyses were additionally weighted to account for missing data on participation (n = 305) for those who had reported on availability. The results showed no difference between the reported results and that of the sensitivity analyses.

5.5 Discussion

This study aimed to investigate the perceived availability of, and reported participation in, health behaviour-related activities offered by a large public-sector organisation as part of comprehensive WHP. Significant differences in reported availability of activities were observed for socio-demographic health, and work factors, however many of these disparities were not reflected in associations with participation after we accounted for the number of activities respondents indicated were available to them. Only administrative staff or respondents reporting any leisure-time physical activity were more likely to have participated in activities. Current smokers and respondents with cardiometabolic conditions were less likely to participate, similarly health department employees and respondents with variable work schedules. Interestingly, a marked relationship that saw all workers over 30 years old less likely to report activities available was the opposite direction for participation, with a trend for increasing levels of participation associated with increasing age.

One of the key elements of Healthy@Work's underpinning framework and implementation plan was to provide equitable access for employees irrespective of their health status or role within the state service. It was hoped that groups with specific needs, including lower-paid or shift-workers, females and employees at higher risk of preventable disease would be enabled to participate (26). Few published studies have investigated individual, health and work factors associated with availability of, and participation in WHP activities delivered in a non-trial setting. Our findings align with Grosch and colleagues (21), who concluded in their investigation into WHP, using US National Health Interview Survey data, that participation was less contingent on individual and organisational characteristics than on objective activity availability. We observed disparities in subjective activity availability across a range of demographic, work, and health factors. Despite the differences, some of them marked, few were reflected in the results for participation once we had taken into account variable activity availability. This highlights the importance of ensuring equitable activity access.

Despite the focus on equitable activity availability, our results indicate that there were likely to be perceived as well as actual disparities in activity availability within Healthy@Work. For demographic factors, respondents who were female or older than 30 years were less likely to report more activities available to them. Communication strategies may have been ineffective at capturing the attention of these groups (22), or employees may not have noticed available programs if the activities did not register as being personally relevant, interesting or helpful to older or female workers. In contrast, our results for the education and health departments, as well as agencies with more than six worksites, demonstrate probable differences in actual as well as perceived availability (41). As an example of greater perceived availability, respondents who indicated they sat at work for more than three hours on a typical day reported there were multiple activities available to them, a signal of the relative ease of implementing comprehensive programs in an office-based or administrative environment where prolonged occupational sitting is typical (42).

Actual inconsistencies in activity availability across large, geographically and occupationally diverse agencies, such as education and health, are also likely given the inherent challenges involved in implementing programs across many sites within a relatively short time horizon. Variable work patterns and job demands provide an additional challenge (43). It is doubtful that implementation occurred with comparable time frames, reach and comprehensiveness across approximately 1500 state service work sites over the course of Healthy@Work. Sustainable comprehensive workplace health promotion can take many years to fully establish even in less disparate settings (25) and organisations and individual worksites can differ in regard to readiness to engage in a participatory program of health promotion (44). Despite dedicated practical, policy, and fiscal support from a central Healthy@Work support team and a small grants process, Healthy@Work was the product of a ministerial directive to implement WHP, in effect a mandated requirement for each agency to deliver a comprehensive WHP program. Readiness to engage with Healthy@Work at agency and work-unit levels would therefore have been variable. Indeed, some agencies were already active in WHP when

Healthy@Work was initiated. More time may have been needed in some areas of the state service for the necessary cultural and implementation foundation work to occur before an equitable rollout of activities was evident.

After accounting for variability in reported availability, we found significant differences in levels of participation across a number of health and work factors. Much research has sought to identify individual, health and work factors associated with participation with a view to informing intervention design and implementation practices that improve program participation and outcomes (21, 45, 46), however results can differ (16). Our outcome that few of the measured socio-demographic variables were associated with participation differs somewhat from Robroek and co authors' (16) systematic review of participation in worksite health promotion programmes. They, as well as other studies, observed that female or married employees were more likely to participate (47-50), in contrast to our findings that showed no difference in participation by sex or marital status. Yet, in accordance with our study, Robroek reported no association for education.

Compared to previous research that demonstrated higher levels of participation for younger employees and those with higher income (21, 49), our study observed trends in opposite directions, with participation less likely for those with higher incomes and more likely as age increased. The finding for age is striking. Optimising the health and work ability of an aging workforce (51) will only increase in importance as many countries around the world deal with a large, aging cohort from the post-World War II 'baby boom', in addition to increases in, or plans to raise, the retirement age (52). For example, Australia's retirement age is slated to incrementally increase to 70 years of age by 2035 before workers can claim an aged pension. In a systematic review of health promotion needs of older workers, Crawford (53), highlighted the dearth of intervention research in the health management of this group, despite the potential to improve health outcomes and reduce the risk of early retirement. The authors concluded that equal access to health promotion for all workers is key, but that large research gaps exist. Our findings demonstrated that older workers in the state service were inclined to participate in more activities, if they were available to them. Activities that are

suitable and accessible to the entire age range of workers is key, as well as ensuring appropriate communication and engagement strategies are employed to help workers of all ages be aware of and involved in activities (22, 52-54).

A principle objective of Healthy@Work was to reach and engage employees with the highest health and lifestyle factor risks. Some argue that programs tend to engage employees who are already more likely to be engaging in healthier behaviours (55). Our findings that respondents who reported higher levels of leisure time physical activity were more likely to participate in more activity types, while current smokers were less likely, is in line with previous research (56-58). Further, respondents in our study who reported at least one cardiometabolic-related health condition, most commonly high blood pressure or cholesterol, had a reduced likelihood of participating in multiple activities. It would appear that at least for these factors Healthy@Work was not successful in engendering equal or greater participation for these at risk groups and physically inactive employees, highlighting the challenge of engaging employees with suboptimal health risk and behaviours. Previous research has highlighted lack of motivation and a perception that employees are best equipped to manage their own health as reasons for employees with suboptimal health avoiding health promotion at work (15). Finally, factors relating to work and organisational characteristics, such as part-time or shift work or workers with lower occupational status, can be associated with lower participation (59). Although no differences were seen for shift work and participation in the present study, lower participation was reported for employees with varying work schedules, and mirrored again in the health department where irregular work patterns and inflexible work demands are typical (60). Alternatively, administrative staff were more likely to participate in more activities, perhaps due to having more flexibility to participate or scheduling of activities being tailored towards a regular Monday to Friday daytime schedule.

There will always be employees who are not interested in engaging with WHP for a raft of personal, health or logistical reasons (61). In some instances, employees may choose not to participate in activities offered through their workplace because they already devote time to health activities outside of the workplace, have a preference

not to engage with workplace-based activities, or feel an imperative to work while at work due to part-time or irregular work schedules (59, 62). As is typical of working populations, the majority of our respondents reported being in good to excellent health, and may have regarded themselves as sufficiently healthy and in no need of participating in Healthy@Work activities (61). Yet, our study observed clear signals that when there was parity in regard to activity availability, we were less likely to see differences in participation for many factors. Plainly, equitable WHP availability is an essential precursor to activity participation across all factors. For an organisation seeking to maximise WHP results, individual barriers to participation can be challenging to address, whereas work and organisational factors affecting participation are more susceptible to modification. Strategies such as ensuring appropriately tailored and relevant support, targeted and effective communication, flexibility in accessing programs and support from organisation to do so are recommended (25, 63). The traditional activity-based approach may not be suitable for all, and as such alternative telephone- or internet-based supports may overcome difficulties participating due to scheduling, irregular work patterns (27, 64, 65), or other accessibility challenges such as remote work locations or delivering WHP to employees who change work sites frequently (66). Beyond the focus on activities, the broad organisation- and agency-level cultures need to be supportive of healthy behaviours and wellbeing at a policy, environment, and management level (25, 67).

There are limitations to this study. The cross-sectional design does not allow us to infer temporal relationships. Therefore we are unable to conclude, for example, whether respondents with higher levels of leisure time physical activity were more likely participate in more activity types, or those who participated in more activity types became more physically active as a result. The analyses were also reliant upon self-reported activity availability. The Tasmanian State Service did not collect objective data for activity availability at each of its approximately 1,500 worksites. Rather, aggregate data was collected in yearly Healthy@Work program progress audits required by each agency. This aggregate data was not sufficiently detailed to reflect activity availability at particular worksites, thus employee perceptions of program availability were used. However, it is possible that some employees were

unaware of activities that were available to them, and would therefore not have reported these as available in our survey. Perceived availability may also be influenced by a respondent's existing health behaviours. For example, a physically active employee who seeks opportunities to engage in active pursuits may be more likely to register the availability of a physical activity program than a physically inactive employee. Self-reported data of health-related behaviours may be biased, particularly where employees are asked to report negative or harmful behaviours. However, well-validated measures were used to increase the likelihood of accurate measurement of lifestyle factors, and the overall proportions and average levels of the various lifestyle factors were similar to Australian (68) and Tasmanian population health estimates (69), with the exception of smoking which was less prevalent in our study population. Data were also weighted for non-response and for our findings to be generalisable to the Tasmanian State Service. The activity data reported in this paper was restricted to SNAPS-related WHP activities, which were a primary, but not exclusive focus of each department's Healthy@Work program. Other program activities not included in these analyses included flu vaccinations and mental health programs. Also, expected program elements, such as changes to policies, procedures and amenities that were addressed by all departments were outside the scope of this paper.

A further consideration is that participation data in the current analyses are related to the number of health-related behaviour activities respondents participated in, not the number of times respondents participated in each program type, or overall activity participation dose. This means that the current study is concerned with the breadth of program reach rather than the level of participation in each activity type. Yet our investigation of the range of activities respondents were exposed to, and participated in, aligns with the Healthy@Work objectives and comprehensive WHP more broadly, to make available a variety of activity and environmental stratagems to target multiple health behaviours. In addition, this approach minimises potential reporting inaccuracies based on three-year recall of the number of times respondents reported participation in each activity type. The approach also circumvents issues relating to the meaningful comparison of levels of participation

across the different activity types. For example, participating once in an education session may represent a full 'dose' of that activity type, whereas a respondent who participated in an intervention designed to interrupt sitting may record they had participated in that activity type many hundreds of times. It is possible that the low response rate may have created non-response bias, but there is no way of determining this with certainty. To help address this possibility, and for our findings to be generalisable to the TSS, data were weighted for nonresponse using a method described in the statistical analysis section.

Finally, further strengths of the study are the use of a large sample size, and the novelty of a pragmatic investigation into comprehensive WHP implemented in a large and diverse multi-site public sector, and non-trial, setting.

5.6 Conclusion

Disparities in availability of activities were reported for a number of factors. Only administrative staff or respondents reporting any physical activity were more likely to have participated. Smokers, health department employees and respondents with variable work schedules or cardio-metabolic conditions were less likely to participate. Significant trends were observed between participation and age. Inequitable access to activities, and lower levels of participation in some at risk groups, was apparent. Efforts to minimise these disparities through flexible or targeted program delivery might optimise participation in comprehensive WHP.

5.7 Postscript

The results of this chapter suggest that there were a number of individual and organisational factors associated with activity availability and participation for Healthy@Work. It is known that attitudinal, environmental and social factors can also be impediments to or enablers of participation. The results for the investigation into participation barriers and facilitators for Healthy@Work are presented in Chapter 6.

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Chapter 6

Barriers and facilitators to participation in workplace health promotion (WHP) activities: results from a cross-sectional survey of public-sector employees in Tasmania, Australia

Chapter 6. Barriers and facilitators to participation in workplace health promotion (WHP) activities: results from a cross-sectional survey of public-sector employees in Tasmania, Australia

6.1 Preface

The finding presented in the previous chapter identified a number of factors associated with WHP activity and participation. Involving workers in program design, conducting needs assessments and cultivating support to participate from managers and colleagues are among common implementation strategies recommended to facilitate workplace health promotion participation. This chapter aims to examine the relationship between facilitating factors and participation in multiple types of activities, as well as identify barriers to participation in this employee population.

6.2 Introduction

Adverse lifestyle behaviours, including cigarette smoking, insufficient fruit and vegetable intake, risky alcohol consumption, physical inactivity and sedentariness, are associated with numerous chronic diseases (1) and an increased mortality risk (2). Workplaces have been identified as important settings where employees can be supported to make healthier lifestyle choices (3-6), and modest effects have been demonstrated for high-quality evidence-based workplace health promotion improving health and work outcomes (7-13). Comprehensive workplace health promotion (WHP) addresses the cultural, environmental and policy influences on employee health, as well as providing activities designed to promote individual employee behaviour change (14). Participation in WHP activities, however, can be low or variable. A systematic review of participation in physical activity and nutrition programs in public- and private-sector organisations found that participation levels in the included studies were often below 50%, and ranged from 10% to 64% (15).

Participation facilitators and barriers are frequently defined as relating to program implementation(16), to individual-level characteristics or attitudes (17, 18), or socio-environmental supports (19, 20). Commonly identified barriers include inconvenient activity scheduling and locations, activities lacking personal relevance, employee

time constraints and physical impediments to participation (21-24). Facilitating factors that are designed to enhance employee engagement include offering multi-faceted programs of broad appeal to employees with differing needs (15, 25), and positive social support (26). Further, a participatory approach to program design and implementation that involves and empowers workers is recommended to build on the factors that encourage and support participation and overcome foreseeable barriers (27-30). Key strategies include: cultivating management and peer support; enlisting employee involvement to identify employee health needs, and activity and delivery modality preferences (31); convenient and accessible scheduling of activities (27) and effective communication regarding the available activities and supports (32). Previous research exploring the use of participatory processes in the development of a weight-loss program for correctional employees concluded that employee participation in the design process enhanced the program outcomes (30).

While the endorsements for participatory methods are encouraging, less is known about how commonly recommended facilitating factors translate to participation in WHP activities that are provided as part of a 'real-world' comprehensive program underpinned by participatory practices. Comprehensive workplace health promotion implementation across diverse, multi-site and multi-occupation settings presents clear challenges, yet given the potential for gains in employee health, productivity (33), and for employers to more fully realise the health and organisational benefits of their programs, it is important to further explore participation facilitators and barriers in such settings. In the context of a WHP program in an Australian public-sector population, the aims of this study were to investigate: (1) associations between employee perceptions of WHP participatory strategies, and levels of participation in WHP programs; (2) barriers to participation and associations with levels of participation; and (3), to identify any barriers to participation in this setting that were unanticipated *a priori.*

6.3 Methods

6.3.1 Study population

The island of Tasmania is the southern-most state of Australia, with a population of approximately 500,000 people. The Tasmanian State Service (TSS), one of the largest

employers in the state, committed more than AU$2,000,000 from 2009-2013 to support the implementation of Healthy@Work, a workplace health promotion initiative designed to improve the health and wellbeing of its whole workforce. The program was to encompass approximately 30,000 employees across a diverse range of occupations, job types (e.g. blue collar, white collar, service), fourteen state government departments or agencies (such as education, health, police, and forestry), locations (metropolitan, rural, or remote) and number of worksites. For example, the Education Department includes over 200 individual worksites, and overall, the TSS had close to 1500 worksites when Healthy@Work commenced. The strategic plan for Healthy@Work focussed on equitable access to activities across the state service, organisation-based strategies to shape culture and management strategies, encouragement of leadership involvement and support, and sustainability of programs through training and professional development for key staff within each agency (34). Further to this, agency WHP facilitators were provided with training and capacity building in design and implementation of workplace health promotion. Facilitators were encouraged to utilise a number of recommended best-practice strategies (35): a participatory approach to program design, including conducting needs assessments, establishing a workplace health committee, and cultivating peer support (36); iterative program evaluation and revision; and integration of WHP programs with existing occupational health and safety advisory groups and policies. Agency-specific activities were to assist employees to address smoking, nutrition, alcohol consumption, physical activity, sedentary behaviour and mental health. Because strategies and activities were tailored to individual worksites and employee needs, they differed across agencies and worksites.

This study used cross-sectional data collected in 2013 as part of the *partnering*Healthy@Work collaboration between the TSS and the University of Tasmania. The aim of the partnership was to evaluate the health and economic outcomes of Healthy@Work. The sample was a stratified random sample of all TSS employees, with stratification by government agency, employment contract (permanent, casual/fixed term) and work classification (full-time, part-time). Written, informed consent was obtained and returned with the self-administered

postal survey. The research had ethical approval from the Human Research Ethics Committee (Tasmania), reference no. H0010501.

6.3.2 Measures

Sociodemographic and health characteristics

Sociodemographic and health information collected included age, sex, education level, work characteristics, and self-reported health status using the first item of the Short-Form Health Survey (SF-12) (37). Body mass index (BMI) was calculated from self-reported weight (kg) and height (m) as BMI = weight/height2. Weight status was then categorised as underweight/normal (BMI<25kg/m^2), overweight (25≤BMI<30kg/m^2) or obese (BMI≥30kg/m^2).

Health-related behaviours

Measures used to collect data on lifestyle factors have been described in detail elsewhere (38). Briefly, physical activity was measured using the long-form of the International Physical Activity Questionnaire (IPAQ) (39) and an additional question in the style of the IPAQ that asked respondents to estimate the total time spent sitting at their workplace during a typical work day, including meal and snack breaks. Diet was assessed using cup-equivalents of daily vegetable (excluding potatoes) and fruit intake (cup-equivalents/day) (40), and the three-item Alcohol Use Disorders Identification Test (AUDIT-C) was used to estimate alcohol intake (41). Respondents were categorised as current smokers or non-smokers (combining ex-smokers and never-smokers).

Facilitators and barriers to participation

Respondents were asked how they felt about statements regarding common facilitators and barriers (e.g. “I was consulted in the design of the activities” or “Problems with my health prevent me from participating”) even if they did not report participation in any workplace health promotion activities available to them. The statements were devised based on key constructs derived from implementation literature, WHP audit measures previously used by the Tasmanian State Service, and the Well@Work assessment of WHP programs (42). The four response options ranged from ‘strongly agree’ to ‘strongly disagree’, and responses were collapsed to

agree or disagree for analysis as we were interested in whether or not a factor was perceived to be present. Respondents were also asked "Has anything prevented you from participating in the health and wellbeing activities offered through your workplace?" and if yes, to describe what. Two members of our team (MK and KJ) independently coded the free-text responses into 19 categories. Discrepancies in coding were resolved following discussion between the researchers.

Availability of and participation in WHP activities related to health behaviours

Respondents indicated whether or not they perceived a number of different types of WHP activities were available to them in the previous three years, the time during which Healthy@Work was implemented. Activity types included education, health assessments, physical activity, 'walk and talk' active meetings, mental health and wellbeing promotion, flu vaccination, smoking cessation, interrupted sitting programs, regular health and wellbeing activities organised through the workplace and subsidised membership to off-site facilities or programs. Respondents then indicated if they had participated in each type of activity reported available. For the current analyses, we were interested in availability and participation data for programs that could relate to health-related behaviours (smoking, nutrition, alcohol intake, physical activity and sedentary behaviour, SNAPS-related activities), given the strong association between these lifestyle factors and common non-communicable diseases, including cardio vascular disease and Type 2 diabetes. Participation was defined as participation (yes/no) in each type of SNAPS-related WHP program, and grouped for analysis as no participation (if programs were available), participation in one program, or participation in two or more program types.

Health change targets (HCTs) and stage of change

Participants responded to the question 'What would you say is the single most important thing you personally could do to improve your health or reduce your risk of getting sick?' Respondents were also asked whether they were "not thinking of making this change" (pre-contemplation), "thinking of making this change, but not in the next two weeks" (contemplation), "thinking of making this change in the next two weeks" (preparation), or "trying to make this change at the moment" (action) (26). These HCT and readiness to change questions were asked early in the

questionnaire battery to avoid contamination by having just answered health assessment questions.

6.3.3 Statistical analysis

Descriptive statistics are reported using unweighted proportions, or means and standard deviations (SD). Ordinal log-link regression (43) was used to estimate the probability of being in a higher category of participation for respondents who agreed with statements about facilitators and barriers and who reported at least one SNAPS-related programs being available. Covariates for other study factors were included in the final models if inclusion increased model fit, as assessed by a Wald test, or produced a change greater than 10% (44) in the coefficient of the covariate for the facilitator or barrier. Covariates were included in the final models for sex, age, and work schedule. Additional adjustment was made for the reported number of available SNAPS-related programs. Using a process described in detail elsewhere to address possible response bias (45), non-missing data were weighted for non-response using the inverse of the estimated probability of participation for each survey participant (46). Ratios of prevalence (PR) and 95% confidence intervals (CI) are reported. Weighted proportions are reported together with unweighted numbers of participants for each participation group. Each analysis was based on all available data, and analyses were conducted using Stata, version 12.

6.4 Results

6.4.1 Participant characteristics

Of the eligible sample of 12,008 Tasmanian State Service employees, 3,228 (26.9%) completed the postal questionnaire. Respondents were similar to state service employees as a whole for the characteristics recorded in state service administrative data. For example, approximately 70% of state service employees in 2012-13 were female, and the age distribution of respondents was consistent with that reported for the whole of state service (47).

Table 6.1 below summarises the sociodemographic characteristics of respondents. Their mean age was 46.2 (SD 10.3) years, and 71.6% were women. The majority of respondents (54.4%) had university or postgraduate education, were married/living

as married (77.0%), or permanent employees (87.4%). For self-rated health, 87.4% respondents reported being in good, very good, or excellent health. No significant differences were observed when sociodemographic and health data was compared between all survey respondents and those respondents who had data for barriers and facilitators to participation, and levels of participation.

Table 6.1 Characteristics of participants in the *partneringHealthy@Work* survey of Tasmanian State Service employees conducted in 2013

	N = 3228	
Male, % (n)	28.4	(917)
Age (years), mean (SD)	46.2	(10.3)
Age group, % (n)		
<30 years	7.3	(234)
30-39 years	16.4	(529)
40-49 years	28.4	(915)
50-59 years	39.4	(1273)
60+ years	8.6	(277)
Marital status, % (n)		
Married/living as married	77.0	(2475)
Separated/widowed/single	23.0	(739)
Education, % (n)		
≤ Year 12	19.1	(614)
Trade/certificate/diploma	26.5	(855)
University	31.9	(1027)
Postgraduate	22.5	(726)
Work condition, % (n)		
Full-time work	58.2	(1878)
Part-time work	41.8	(1350)
Work category, % (n)		
Permanent	87.4	(2820)
Fixed term/casual	12.6	(408)
Work schedule, % (n)		
Monday to Friday	57.7	(1852)
Days vary/other	42.3	(1359)
General health status, % (n)		
Excellent/very good/good	87.4	(2813)
Fair/poor	12.6	(407)
Reported availability of SNAPS-related WHP activities*		
No activities	21.2	(669)
One activities	24.4	(770)
Two activities	19.9	(629)
Three or more activities	34.5	(1091)

*Availability defined as number of SNAPS-related WHP activities (smoking, nutrition, alcohol or physical activity/sedentary behaviour) reported available during the previous three years.

Estimated prevalence of participation and prevalence ratios are reported in Table 6.2 below for facilitation factors. For each facilitating factor, the ratios calculated on an ordinal scale indicate the probability of being in a higher category of participation for respondents who agreed with each statement about facilitators relative to those who disagreed. For example, after further adjustment for availability of programs, respondents who agreed that in general activities were interesting to them were 35% more likely to be in a higher group for participation than those who disagreed (PR=1.35, 95%CI 1.29, 1.42). Agreement that activities were well publicised (PR=1.09, 95%CI 1.04, 1.15), were relevant to their needs (PR=1.23, 95%CI 1.17, 1.28) and convenient to participate in (PR=1.22, 95%CI 1.17, 1.28) were similarly associated with participation in more activities. In all models, adjustment for availability of SNAPS-related programs attenuated the prevalence ratios for each facilitating factor, but all relationships between facilitating factors and levels of participation remained significant.

Table 6.3 below shows estimated prevalence of participation ratios for agreement with statements relating to barriers to participation. Following further adjustment for availability of activities, employees who had trouble fitting in activities around other commitments (PR=0.93, 95%CI 0.89, 0.97), or who perceived they were too busy at work (PR=0.91, 95%CI 0.88, 0.96), or who had health problems that prevented them from participating (PR=0.88, 95%CI 0.81, 0.96), were significantly less likely to be in a higher category of participation than those who did not perceive that barrier.

These results for facilitators and barriers were independent of departmental grouping (health, education, or all other agencies). No interactions of more than minor size were found between program availability and any of the facilitators or barriers. There was no clear pattern of association between perception of barriers and the stages of change respondents nominated for their health change targets (HCT).

Table 6.2 Prevalence of participation in workplace health promotion activities for Tasmanian State Service employees who agreed with statements about facilitating factors, and ratios of prevalence on an ordinal scale relative to those who disagreed

	No participation*	Participated in one program*	Participated in two or more programs*		
Facilitating factor	% (n/N)†	% (n/N)†	% (n/N)†	PR (95%CI)‡	PR (95%CI)§
Program implementation					
'I was consulted in the design of the activities'	6.9 (39/470)	11.9 (108/897)	26.6 (192/728)	1.23 (1.18, 1.29)¶	1.17 (1.12, 1.22)¶
'The activities offered can improve my health and wellbeing'	74.4 (344/468)	77.4 (701/897)	86.6 (638/728)	1.16 (1.09, 1.24)¶	1.10 (1.03, 1.17)¶
I feel in general the activities were:					
Well publicised	46.0 (227/471)	51.5 (472/894)	70.2 (529/723)	1.18 (1.12, 1.24)¶	1.09 (1.04, 1.15)¶
Interesting to me	26.6 (114/463)	53.0 (468/888)	71.6 (527/721)	1.41 (1.34, 1.49)¶	1.35 (1.29, 1.42)¶
Relevant to my needs	30.5 (131/461)	48.6 (428/887)	63.6 (464/713)	1.28 (1.22, 1.34)¶	1.23 (1.17, 1.28)¶
Convenient to participate in	24.6 (117/466)	44.9 (397/890)	58.0 (430/719)	1.28 (1.22, 1.34)¶	1.22 (1.17, 1.28)¶
Helpful	40.3 (176/451)	52.7 (463/871)	72.3 (529/712)	1.28 (1.21, 1.34)¶	1.19 (1.13, 1.25)¶
Peer and environmental support					
'My organisation places a high priority on these activities'	19.6 (98/464)	27.2 (253/887)	50.2 (391/724)	1.25 (1.19, 1.30)¶	1.14 (1.09, 1.19)¶
'I have the support of my managers to take part'	57.2 (266/459)	67.5 (605/895)	81.0 (594/724)	1.25 (1.18, 1.32)¶	1.16 (1.10, 1.23)¶
'My co-workers were interested in taking part'	40.7 (188/454)	56.9 (504/890)	68.3 (512/722)	1.23 (1.17, 1.30)¶	1.22 (1.16, 1.28)¶

*Participation defined as number of SNAPS-related WHP programs (smoking, nutrition, alcohol or physical activity/sedentary behaviour) participated in during the previous three years. †Weighted proportions and unweighted numbers are reported *PR (95% CI) = prevalence ratio (95% confidence interval) for ordinal outcomes. ¶ Denotes $p < 0.001$. ‡Adjusted for sex, age and work schedule. §Adjusted for sex, age, work schedule and number of available SNAPs-related WHP programs.

Table 6.3 Prevalence of participation in workplace health promotion activities who agreed with statements about barriers to participation, and ratios of prevalence on an ordinal scale relative to those who disagreed

Barriers	No participation* %(n/N)†	Participated in one program* %(n/N)†	Participated in two or more programs* % (n/N)†	PR (95%CI)‡	PR (95%CI)§
'I am already doing enough outside of work to maintain my health and wellbeing'	60.4(292/480)	58.7(505/897)	63.7 (456/722)	1.02 (0.97, 1.07)	0.99 (0.95, 1.03)
'Problems with my health prevent me from participating'	8.7(45/476)	10.4(97/896)	6.9 (154/718)	0.96 (0.90, 1.05)	0.88 (0.81, 0.96)¶
'My health is not the responsibility of my employer'	50.8(249/470)	50.1(451/889)	47.9 (346/701)	0.96 (0.92, 1.00)	0.98 (0.94, 1.01)
'I have trouble fitting in these activities around my family/other commitments'	66.4(319/479)	57.1(507/899)	50.6 (361/717)	0.89 (0.85, 0.93)¶	0.93 (0.89, 0.97)¶
'I am too busy at work to have time to participate'	65.3(311/473)	56.2(499/888)	46.4 (323/715)	0.87 (0.83, 0.91)¶	0.91 (0.88, 0.96)¶

*Participation defined as number of SNAPS-related WHP programs (smoking, nutrition, alcohol or physical activity/sedentary behaviour) participated in during the previous three years. †Weighted proportions and unweighted numbers are reported *PR (95% CI) = prevalence ratio (95% confidence interval) for ordinal outcomes. ¶ Denotes $p < 0.001$. ‡Adjusted for sex, age and work schedule. §Adjusted for sex, age, work schedule and number of available SNAPs-related WHP programs.

Table 6.4 Category definitions, proportions and example responses for free-text responses to barriers to participation (N=1461)

Barrier *(subcategory)*	%* (n)	*Example responses*
Time	24.6 (359)	*Lack of time; time constraints; competing time commitments.*
Workload or other work characteristic	17.3 (253)	*Workload became too heavy; I work very long hours to fulfil every aspect of my job; travel during work hours; nature of my work, there is no down time or flexibility; staffing levels do not allow staff to participate in any activities; no one to backfill my position so I couldn't go.*
No WHP available	13.7 (200)	*They basically don't exist; Because there are none; Unavailability; They didn't offer any!*
Part-time/shift-work patterns	10.8 (157)	
Work pattern		*My differing work hours; Shift work – not always available when working; Part-time work, i.e. activities occurring on non-work days;* [Activities] *oriented time wise to fixed hour workers (Mon-Fri) with late start times and/or fixed time for lunch break – what a luxury rotational shift workers don't have!!!*
Imperative to work		*Part-time work and the perception to 'work' while there; Work only three days, feel awkward taking time out to*
Work load		*Being part-time, the time I am there is busy; Time constraints through working part time.*
Scheduling	9.9 (144)	*Scheduling conflicts; Time of activity after work; Times offered clashed with the necessity to work; Timing not suitable.*
Location	9.0 (132)	
Off-site activities		*They are not offered at my worksite, too hard to leave work to participate; They are not offered at my workplace, I would have to travel off site to participate; Too far to ride/walk; some occur 20 mins & parking away.*
Head-office bias		*Activities only promoted/offered in city centre offices; Most are offered at head office, I am regional.*
Regional disparity		*Most were held in a different area of the state; Some are location based – only done in Hobart* [state capital], *not regional areas; I work on the east coast (2.5hrs from Hobart/Launceston* [largest Tasmanian centres]*).*
Knowledge/awareness of programs	7.5 (110)	*No knowledge of them; if there was anything offered, I was unaware; don't remember seeing many; lack of information; didn't hear about them; lack of awareness that they were running; lack of information/poor communication.*
Health issues	5.7 (83)	*Health; poor health; spinal injury; hip trouble; genetic medical condition; pregnancy; mastectomy and reconstruction; chronic fatigue; physical limitations due to chronic pain; arthritis; bad knee; anxiety.*
Limited availability or range of activities	5.1 (75)	*Very limited options available; a lack of these* [activities*] and only 1 or 2 times; nothing apart from flu vaccination was offered; not much variety; few offered – those that were are irrelevant; only had one theory session on mental health; Global Corporate Challenge is the only offer.*

* Respondents could nominate more than one barrier to participation.

In respect of barriers to participation, 1461 respondents provided further information by way of free-text responses. Nineteen barriers were identified, nine by more than 5% of respondents (Table 6.4 above). The most frequently reported of these categories were time (24.6%), workload (17.3%), and having no workplace health activities available to them (13.7%). These are comparable to the pre-specified barrier response options reported in Table 6.3 that were found to be associated with the prevalence of participation. Two categories emerged that were not captured in the pre-specified barriers: part-time/shift-work patterns (10.8%) and location of workplace (9.0%).

6.5 Discussion

This paper investigated associations between perceived participation facilitators and barriers, and participation in WHP activities in a large-scale 'real-world' comprehensive WHP program. Independent of age, sex, work schedule and program availability, employees who agreed with any of the measured facilitating factors were more likely to be in a higher category for participation. Conversely, employees who agreed they had trouble accommodating activities around their family or other commitments, were too busy at work to have time to participate, or had problems with their health, were significantly less likely to be in a higher category for participation. The measured attitudinal barriers did not have an association with levels of participation. Part-time or shift work, and location of activities, emerged as additional barriers in this employee population.

The first finding provides support for the implementation strategies commonly recommended as best practice to minimise employee and organisational barriers that might impede engagement with workplace health activities. In line with recommendations by Shain and Kraimer (27) and previous research, respondents who felt their organisation placed a high priority on the activities, or who believed that they had the support of their managers to participate, or that colleagues were interested in taking part were more likely to participate (48). Manager support to participate has similarly been shown to be associated with a higher likelihood of participation in physical activity programs provided via the workplace (49). From an implementation perspective, respondents were more likely to participate in one or

more types of programs if they felt they were consulted in the design of activities, or that the programs were relevant or interesting to them, helpful, or convenient to participate in. Our results support the consultative and tailored approach to program design and delivery recommended in other studies (30, 50), but extends these findings by quantitatively assessing how the perceived presence of these strategies relates to participation in multiple types of activities delivered in a large and diverse setting.

With regard to the second aim of this research, the findings align with previous research that clearly demonstrate that perceived time constraints are a barrier to higher levels of program participation (26). Nöhammer and colleagues (22) identified a typology of employee-perceived barriers to participation, surveying 237 employees within four medium-large organisations that had high-quality workplace health promotion programs in place. Principal component analysis identified six key components. Aspects of the first component, difficulty integrating workplace health participation into personal life, are reflected by our results showing respondents were less likely to participate in more kinds of programs if they had difficulty fitting participation around family or other commitments, or who felt they were too busy at work to participate. Work stress and being busy at work has been shown to have a detrimental effect on health and health behaviours (51, 52), as it can impact an employee's time and energy for health promoting behaviours in general, let alone participating in workplace health promotion. In addition, our findings support an element of Nöhammer's integration component, which posits that health issues may contribute to an employee having difficulty integrating program participation into their life. Our research extends that of Nöhammer and colleagues by examining these common barriers across levels of participation in a larger sample.

Similarly, all of the pre-specified barriers to participation recurred in the free-text barriers, with time and workload most common. These results reflect those of Fletcher and co-authors (26) who, in a qualitative study of 60 government employees which investigated barriers to participation in workplace physical activity programs, found time constraints to be the most frequently reported barrier, followed by workload and shift-work, depending on occupation type. Our study

identified shift-work and part-time work patterns, as well as location, as self-identified barriers but the current research extends to activities targeting other behaviours in addition to physical activity, and uses a quantitative and qualitative approach across a larger sample. Obvious challenges exist in providing equitable access to programs to workers with irregular or part-time work patterns. Reported difficulties arose from scheduling conflicts, where activities occurred on non-work days, or activity programming was perceived to be oriented to fixed-hour workers. As a result of part-time work hours, some respondents noted an imperative to 'work' while at work, or a high workload associated with reduced time at work, as preventing them from participating in WHP activities. Given that shift or rotational workers can be at heightened risk of poor health and health behaviours, compared with working normal daytime hours, (53, 54), programs need to adopt innovative approaches to ensure equitable access to these workers.

The emergence of location as a barrier was not surprising given the challenge faced by many of the government departments tasked with supporting the establishment of programs over multiple sites across the state. For the education and health departments, which incorporate teachers, health professionals and ancillary supports, this meant endeavouring to cover in excess of 200 work sites spread across a state that is approximately the size of the country of Ireland. Responses for those who nominated location-related barriers to participation included the inconvenience of accessing activities when offered off-site, a reported city-centric or head-office bias or the impracticality of accessing programs due to marked regional/rural disparities.

Time and perceived availability of programs emerged as important barriers in all respects of our study. In large multi-site and multi-occupational organisational settings such as the Tasmanian State Service, addressing these barriers can be a formidable undertaking. However, some support has been demonstrated for workplace-based interventions that employ delivery methods that can increase accessibility and discretionary use of support for employees to address health behaviours. These include web- (55) and telephone-based programs (56), and multi-component programs that involve minimal face-to-face contact (57). To help address

perceived time constraints, Bale and colleagues (49) found that employees who reported having a supportive work environment were more likely to use time at work to exercise, if provided with time to participate during work hours. Similarly, workplace flexibility has been linked with healthier lifestyle and behaviours, and worksite health promotion attendance (58). Such adaptive strategies are unlikely to occur, however, unless participatory factors are in effect at an organisational level, including a multi-level understanding of organisational objectives, broad appreciation of the impact of policies, work and environmental design on health and wellbeing, and the provision of leadership support (59).

There were several limitations to the current study. The data were cross-sectional, thus we were not able to infer causality. The analyses were also reliant upon self-reported data. It was not considered practicable by the TSS to collect objective data regarding activity types available at each of the approximately TSS 1,500 worksites, nor was objective data collected for the specific implementation strategies used at each worksite. Rather, aggregate WHP data was collected in yearly progress audits for each agency. It was felt that this aggregate data was not sufficient to reflect the employee experience at their particular worksite, so employee perceptions of strategies and activity availability were used in these analyses. Employees may have been unaware of strategies used, or activities that were available, and would thus not report these in our survey. Therefore program awareness may be a barrier to participation not explored in our analysis. Further, bias might exist, where employees who respond to a workplace health and well-being survey may differ in their identification of facilitators and barriers than might non-responders. In addition, a respondent's positive experience of program participation might leave them more inclined to positively rate aspects of program implementation in retrospect, rather than these factors driving participation. Strengths of our study are that data was weighted for non-response; we had access to a large, diverse non-United States or European employee sample; and we were able to test workplace health implementation in a 'real-world' context rather than within the boundaries of a classic research trial.

6.6 Conclusion

In conclusion, the results, while cross-sectional, provide support for participatory program implementation strategies. Organisations with multiple sites and/or shift and part-time workers may need to adopt innovative strategies to ensure equitable assistance with promoting employee health and wellbeing. Supportive work environments, with flexible work arrangements that enable and encourage employees to participate during work time, could help to overcome some of the identified barriers.

6.7 Postscript

The findings presented in this chapter identified a number of implementation strategies associated with participation in more types of activities, and barriers associated with reduced participation. For employees who did participate, the following chapter examines benefits associated with participation and then investigates whether there were differences in the employee lifestyle factor profile measured in 2010 and 2013.

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Chapter 7

Benefits of workplace health promotion in a large, diverse Australian public-sector setting: a repeated cross-sectional study

Chapter 7. Benefits of workplace health promotion in a large, diverse Australian public-sector setting: a repeated cross-sectional study

7.1 Preface

The research presented in the previous two chapters showed that there were differences in reported availability of activities for some groups within the Tasmanian State Service, and some respondents, for example smokers, were less likely to participate. The results identified barriers to participation, but provided support for recommended implementation strategies. This chapter examines benefits for those who did participate, and investigates whether differences in employee health-related behaviours and body mass index were observed between 2010 and 2013.

7.2 Introduction

Increased risks of all-cause mortality (1), and non-communicable chronic diseases such as cardiovascular disease, some cancers, and type 2 diabetes (2, 3), are associated with unhealthy lifestyle factors. These factors include smoking, physical inactivity, sedentariness, poor nutrition, overweight and obesity. Workplaces are increasingly regarded as settings in which employees can be supported and encouraged to adopt or maintain healthy lifestyle behaviours (4, 5). Comprehensive, multi-component health promotion programs with activities that target multiple health concerns are considered to be best practice for workplace health (6-9), and meta-analyses and reviews have demonstrated modest positive results that link well-implemented evidence-based workplace interventions to improved health and work outcomes (6, 10-14).

The workplace health promotion (WHP) literature tends to focus on measured changes in employee health-related behaviours or weight. However, as noted by Pronk (15), it is critical to recognise that programs can generate a range of additional outcomes that may also be valuable to employees and employers. For example, there are a number of important intermediate stages prior to appreciable changes in employee lifestyle factors. One interim marker of program success for an

organisation could be a shift in employee motivation to better manage health and wellbeing concerns (16). Furthermore, program facilitators may wish to know if employees felt that engagement with programs helped them to address health-related behaviours, stress management or aspects of their work. Further understanding of these interim outcomes is important when, as Goetzel and colleagues (6) acknowledge, considerable time may be required to achieve meaningful change to employee risk factor profiles.

Numerous non health-related intermediary outcomes might also be of interest to organisations, including enhanced employee organisational commitment (6, 17-19). Employee organisational commitment or engagement is a measure of an employee's psychological attachment to their organisation (20), and is often measured in public-sector surveys of employee perceptions of the work environment (21). Although a bidirectional relationship is likely, efforts made by an organisation to care for the health of its employees is believed to cultivate a positive health climate or culture of an organisation (22), which in turn is posited to strengthen employee commitment to the organisation (23-25). Organisational commitment has been found to mediate turnover intentions (26) and have a strong association with job satisfaction (27), while low commitment has been linked to an increased risk of long-term sickness absence (28). Consequently, organisations are likely to regard organisational commitment as a valued benefit of health promotion efforts, in addition to the potential contribution to productivity (29), absenteeism (30) and employee well-being. It remains unclear, however, if participation in activities that form part of a comprehensive WHP program is associated with organisational commitment (24).

Much of the published evidence for WHP involves randomised controlled trials (RCTs) or quasi-experimental evaluations (14). Such designs are critical for establishing effective elements of programs and overall efficacy (31, 32), yet less is known concerning how these findings translate to comprehensive WHP implemented under normal working conditions, outside of controlled trial settings (10, 33). Increasingly, pragmatic 'real-world' and applied evaluations are being sought (32, 34, 35). Population prevalence techniques have also been suggested as appropriate to measure the health profiles of large groups of employees (6). Finally,

there is a predominance of United States-based research included in efficacy reviews (6, 14). Therefore, using data from an evaluation of a WHP program underpinned by best-evidence WHP principles, and implemented in a diverse Australian public-sector setting, the aims of this study were to (1) explore associations between levels of participation in multiple types of WHP activities and self-reported benefits of participation; (2) investigate the relationship between WHP participation and organisational commitment; and (3) assess employee self-reported health-related behaviours and body mass index (BMI) at two time points (2010 and 2013), using population prevalence techniques.

7.3 Methods

7.3.1 Study population

Tasmania is the only island state of Australia, and is roughly the size of the Irish republic with a population of approximately 500,000. The Tasmanian State Service (TSS) is one of the largest employers in the state with a 28,000 workforce. In 2009 the TSS committed just over AU$2,000,000 to support the implementation of Healthy@Work, a four-year comprehensive workplace health promotion initiative designed to improve the health and wellbeing of its employees. The TSS encompasses a diverse range of state government departments or agencies (such as education, health, police, treasury, tourism, arts and forestry) and occupations, with employees spread across city, rural, and remote locations. Each agency was required to implement its own health and wellbeing program following a directive from the Premier, the head of the state government. Healthy@Work was designed to embed the necessary evidence-based program design and delivery knowledge within the agencies by providing training to key staff members from each agency. Agency Healthy@Work facilitators were further supported by a centralised Healthy@Work unit and a small grants scheme to fund individual agency projects. Agency facilitators were instructed to utilise best-evidence implementation strategies including to: conduct organisational and employee needs assessments, involve employees in program design; incorporate a cycle of program evaluation and revision, and; integrate WHP programs with existing occupational health and safety advisory groups and policies. Agencies were required to implement activities and policies that

addressed smoking, nutrition, alcohol consumption, physical activity, sedentary behaviour and mental health. Activities were to be tailored to individual worksites and employee needs, and thus varied across agencies and worksites.

This study used repeated cross-sectional survey data collected in 2010 and 2013 by the *partnering*Healthy@Work project team, a collaboration between researchers from the University of Tasmania and the TSS. The aim of the partnership was to evaluate the health and economic outcomes of Healthy@Work. Surveys were sent on behalf of the university investigators to establish the independence of the research from the TSS, the employer of the surveyed employees. In both 2010 and 2013 the study populations were stratified random samples of all TSS employees at the time of each sampling procedure, with stratification by government agency, employment contract (permanent, casual/fixed term) and work classification (full-time, part-time). The research received ethical approval from the Human Research Ethics Committee (Tasmania), reference no. H0010501, and written, informed consent was obtained and returned with the surveys.

7.3.2 Measures

Sociodemographic and health characteristics

Sociodemographic and health information collected included age, sex, education level, health status using the Short-Form Health Survey (SF-12) (36). Body mass index (BMI) was calculated from self-reported weight (kg) and height (m) as BMI = weight/height^2. Weight status was then categorised as underweight/normal (BMI <25kg/m^2), overweight (BMI ≥25 <30kg/m^2) or obese (BMI ≥30kg/m^2).

Health-related behaviours

The measures used both in 2010 and 2013 to assess respondent lifestyle factors have been described in detail elsewhere (37). Briefly, to estimate physical activity and time spent in sedentary behaviours, respondents completed the long-form of the International Physical Activity Questionnaire (IPAQ) (38). Total time spent sitting at work on a typical work day, including meal and snack breaks, was estimated using an additional question in the style of the IPAQ which is similar to other validated population-based occupational sitting measures (39, 40). Vegetable and fruit intake

was assessed using cup-equivalents of daily vegetables (excluding potatoes) and fruit intake (41). Alcohol intake was estimated using the three-item Alcohol Use Disorders Identification Test (AUDIT-C). Total scores range from 0-12, with higher scores indicating riskier alcohol consumption (42). Respondents were categorised as current smokers or non-smokers (combining ex-smokers and never-smokers).

Organisational commitment

Items relating to organisational commitment were assessed in the 2013 survey using five statements commonly used in organisational climate surveys in the Australian Public Service and the UK Civil Service (43). The statements are designed to measure the extent to which employees take pride in, feel attached, or are inspired, motivated and willing to recommend their organisation to others. Respondents rate each statement on a five-point scale, ranging from 'strongly disagree' to 'strongly agree'. Responses were dichotomised for analysis to 'agree' and 'disagree/neither disagree or agree'. The statements are known as the Employee Engagement Index when used in public sector climate surveys that measure employee perceptions of the workplace, leadership within the organisation, and personal factors relevant to human resources management such as employee satisfaction and engagement; however, in peer-reviewed literature the statements align closely with organisational commitment measures. Specifically, the first three statements in the current study are comparable to the statements used by Clausen and colleagues (28) to operationalise affective organisational commitment (26), and the final two statements in our study are related to two items from the Organisational Commitment Scale referenced by Angle and Perry (44).

Comprehensiveness of agency Healthy@Work programs

Using data collected from annual audits that were completed by each agency to track overall Healthy@Work implementation progress, we created yearly scores to reflect the comprehensiveness of each agency's Healthy@Work program. Drawing on research for evidence-based delivery of work health promotion (6, 45) agencies were scored according to the degree to which they had achieved six key program components (health education, social environment, physical environment, integration of WHP into the organisation, links to related programs, and health

screening). We then gave agencies a total 'comprehensiveness' score for each year of implementation (with a maximum score of 56).

Employee-reported availability of activities related to health behaviours

Respondents indicated which types of health and wellbeing activities were available to them (yes/no) in each survey. Activity types listed included education, health assessments, physical activity, 'walk and talk' active meetings, regular health and wellbeing activities organised through the workplace and subsidised membership to off-site facilities or programs. Smoking cessation and interrupted sitting programs were asked about in 2013 only.

Participation in workplace health promotion activities related to health behaviours

Respondents indicated in the 2013 survey whether or not they participated in different types of health and wellbeing activities during the previous three years, which covered the implementation of Healthy@Work and the time span between the 2010 and 2013 surveys. Because we were interested in how many different types of activities respondents participated it, we defined participation according to whether or not respondents indicated they had participated in each one of the listed activity types (yes/no). Thus defined, activity participation could range from 0 – 8. We then grouped participation in two different ways for the analyses. First, we grouped participation into three groups, which we defined as: participation in one activity; two activities; or 3 or more activity types. This grouping was used for the analysis of self-reported benefits associated with participation. Respondents were instructed to answer this question set only if they had participated in at least one WHP activity in the previous three years. Second, for the investigation into organisational commitment factors, we divided the participation data into three groups, using a different criterion: no participation (if activities were available); participation in one type of activity; or participation in two or more activity types.

Self-reported benefits of participation

Employee-perceived benefits of participation were collected in the 2013 survey using questions from Well@Work (46). Respondents were asked to respond 'yes', 'no', or 'not sure' to a series of statements regarding whether participation in

workplace health promotion activities they had noted earlier in the survey had motivated or helped them to address lifestyle factors. For example, respondents were asked "Did the workplace health and wellbeing activities listed [in a previous question] help you to improve your health; be more physically active; eat more healthily; drink less alcohol; lose weight; reduce stress; improve your performance at work. Responses were dichotomised for analysis ('yes' = 1 and 'no/not sure' = 0).

7.3.3 Statistical analysis

Unweighted proportions and means with standard deviations (SD) were used to describe the data. Poisson regression with a robust error variance was used for the analysis of self-reported benefits and levels of participation (using 2013 data only), adjusted for age, sex, and education. Ratios of prevalence (PR) and 95% confidence intervals (CI) are reported. Pearson's Chi-squared analyses were used to investigate the association between participation and statements relating to employee organisational commitment (using 2013 data only). Cross-sectional data from the 2013 survey were used for the Poisson regression analyses presented in Tables 7.2 and the Chi-squared analyses presented in Table 7.3. The repeated cross-sectional design was not used for these analyses because data on employee organisational commitment and self-reported benefits following participation was not collected in 2010. Rather, the repeated cross-sectional data from the 2010 and 2013 surveys was used for the analyses presented in Table 7.4, which compared means and proportions of lifestyle factors surveyed in 2010 and 2013 to produce weighted, age and sex-adjusted ratios (with 95% CI). In a process described elsewhere (47), non-missing data were weighted using the inverse of the estimated probability of participation for each survey participant (48, 49). This process helps to address possible response bias by adjusting the weight given to data from survey recipients who did respond, to account for survey recipients who did not respond and are therefore underrepresented in the final sample. These weights are applied for respondents who are comparable to non-respondents on known sampling characteristics. For all analyses, weighted proportions are reported together with unweighted sample fractions.

7.4 Results

In 2010 and 2013, 28.0% (3408/12,179) and 26.9% (3228/12,008) of eligible state service employees completed the questionnaires respectively. Crude comparisons of responding participant data against comparable whole of state service administrative data for each survey year revealed similar proportions in regard of every employment characteristic for which data are available. For example, approximately 70% of state service employees in 2010/2011 and 2012/2013 were female (50, 51).

Table 7.1 Characteristics of participants in the *partnering*Healthy@Work surveys of Tasmanian State Service employees conducted in 2010 and 2013

	2010 (n = 3408)	2013 (n = 3228)
Female, % (n)	71.7 (2444)	71.6 (2311)
Age (years), mean (SD)	46.2 (10.3)	47.0 (10.3)
Age group, % (n)		
<30 years	8.7 (296)	7.3 (234)
30-39 years	17.2 (587)	16.4 (529)
40-49 years	30.8 (1049)	28.4 (915)
50-59 years	35.8 (1220)	39.4 (1273)
60+ years	7.5 (256)	8.6 (277)
Marital status		
Married/living as married	76.4 (2542)	77.0 (2475)
Separated/widowed/single	23.6 (786)	23.0 (739)
Education		
≤ Year 12	20.9 (704)	19.1 (614)
Trade/certificate/diploma	25.5 (858)	26.5 (855)
University	30.5 (1027)	31.8 (1027)
Postgraduate	23.1 (776)	22.5 (726)
Government Department/Agency		
Education	28.6 (976)	29.7 (960)
Health	39.8 (1356)	36.7 (1185)
All other agencies	31.6 (1078)	33.6 (1083)
Work condition		
Full-time work	60.4 (2057)	58.2 (1878)
Part-time work	39.6 (1351)	41.8 (1350)
Work category		
Permanent	91.1 (3104)	87.4 (2820)
Fixed term/casual	8.9 (304)	12.6 (408)
General health status		
Excellent/very good/good	88.0 (2994)	87.4 (2813)
Fair/poor	12.3 (407)	12.0 (408)

Descriptive statistics are shown in Table 7.1 above. Mean age was 46.2 (SD = 10.3) years in 2010 and 47.0 (SD=10.3) in 2013. The proportion of females in each sample was 72% (71.7%, n = 2444, in 2010 and 71.6%, n=2311 in 2013). The majority of respondents in each survey were married or living as married (76.4% and 77.0%, respectively), permanent employees (91.1% and 87.4%), in full time work (60.4% and 58.2%) and more than half of the participants at each time point reported university or postgraduate education (53.6% and 54.3%). In 2010 12.0% of respondents reported being in fair or poor health, and 12.3% in 2013.

The average yearly program comprehensiveness scores for agencies' Healthy@Work programs (with maximum yearly score of 56) were 11.9 in 2010 (range: 6 – 21), 26.4 in 2011 (range: 19 – 37), and 37.9 in 2013 (range: 24 – 49). A clear pattern emerged of increasingly comprehensive WHP being delivered by all agencies between 2010 and 2013. Figure 7.1 below shows the proportion of employee-reported availability of activities in 2010 and 2013. Increased activity availability was reported for all measured activity types between 2010 and 2013 (smoking cessation and interrupted sitting programs were not measured in 2010).

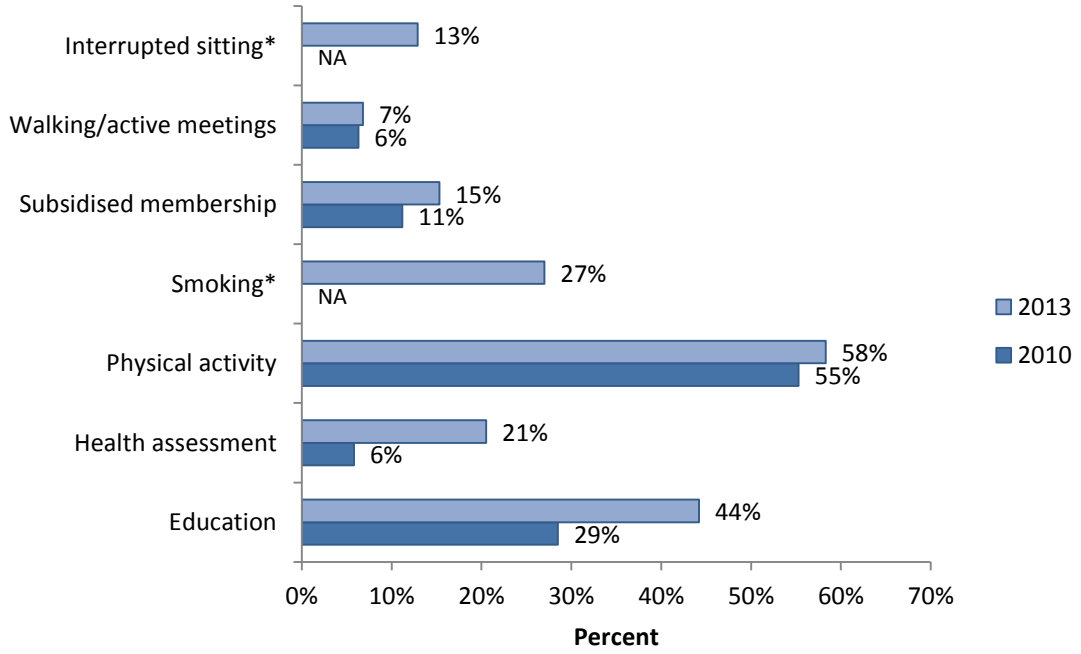

Figure 7.1 Proportion of respondents who reported the WHP activity types were available to them

Table 7.2 below shows the prevalence of self-reported motivation to adopt or maintain healthier behaviours, and of self-reported assistance by workplace health promotion (WHP) SNAPs-related activities to do so, at three levels of activity participation. Significant trends were observed between participation and respondents agreeing that activity participation had made them motivated to address their physical activity, diet, or alcohol intake, or helped them to address stress, weight, health, work performance and all measured health-related behaviours (trends: $p<0.05$), with the exception of participation helping respondents to stop smoking. For example, compared to respondents who participated in one activity type, respondents were significantly more likely to report that participation made them motivated to be physically active if they had participated in two activity types (Prevalence Ratio (PR) = 1.20, 95% confidence interval (95%CI) 1.05-1.37), or three or more activity types (PR = 1.72, 95%CI 1.53-1.94). Likewise, there was a dose response relationship between levels of participation and agreeing with the statement that participation helped respondents to improve their health. Respondents who participated in two activity types were 28% more likely to endorse the statement 'the workplace health promotion activities helped me to improve my health' (PR = 1.28, 95%CI 1.10-1.50), or 85% more likely for three activity types (PR = 1.85, 95%CI 1.60-2.13), compared to the reference category. Similar dose-response relationships were observed for levels of participation and respondents agreeing that participation in SNAPS-related WHP activities helped the respondent to reduce stress, eat more healthily and improve performance at work. All results were independent of effects of age, sex, and education.

Table 7.2 Prevalence of self-reported motivation to adopt or maintain health behaviours, and of self-reported assistance by workplace health promotion (WHP) programs to do so, at three levels of participation in SNAPS-related WHP activity types

Outcome	Participation in WHP programs								
	One program*			Two programs*			Three or more programs*		
	%†	(n/N)‡		%†	(n/N)‡	PR (95%CI)¶	%†	(n/N)‡	PR (95%CI)¶
The WHP activities:									
made me motivated to -									
Be physically active#	42.8	(327/753)	*Ref*	51.5	(213/395)	1.20 (1.05, 1.37)	71.3	(200/273)	1.72 (1.53, 1.94)
Quit smoking§	2.7	(19/656)	*Ref*	3.6	(13/319)	1.38 (0.67, 2.86)	5.6	(12/197)	2.28 (1.07, 4.86)
Eat more healthily#	20.2	(150/722)	*Ref*	32.5	(132/378)	1.61 (1.31, 1.99)	50.0	(133/257)	2.52 (2.07, 3.06)
Drink less alcohol#	5.6	(40/697)	*Ref*	10.6	(39/359)	1.95 (1.25, 3.04)	18.7	(47/236)	3.60 (2.38, 5.45)
helped me to -									
Improve my health#	34.8	(264/757)	*Ref*	44.6	(185/399)	1.28 (1.10, 1.50)	62.6	(173/273)	1.85 (1.60, 2.13)
Be more physically active#	37.4	(288/756)	*Ref*	46.8	(196/400)	1.26 (1.09, 1.46)	66.8	(188/276)	1.86 (1.63, 2.12)
Quit smoking	2.8	(19/653)	*Ref*	1.9	(7/312)	0.77 (0.33, 1.78)	4.2	(9/202)	1.58 (0.70, 3.56)
Eat more healthily#	17.7	(129/724)	*Ref*	23.9	(97/376)	1.36 (1.06, 1.74)	39.1	(110/260)	2.24 (1.79, 2.81)
Drink less alcohol#	4.0	(28/698)	*Ref*	6.8	(25/361)	1.65 (0.95, 2.87)	12.4	(33/240)	3.29 (1.98, 5.49)
Lose weight#	13.0	(95/716)	*Ref*	15.0	(56/373)	1.14 (0.83, 1.58)	31.4	(82/254)	2.51 (1.92, 3.29)
Reduce stress#	20.9	(150/724)	*Ref*	29.0	(111/377)	1.40 (1.12, 1.75)	43.7	(115/258)	2.14 (1.74, 2.64)
Improve my performance at work#	17.4	(123/724)	*Ref*	24.2	(88/377)	1.43 (1.11, 1.84)	40.2	(105/258)	2.30 (1.82, 2.91)

*Participation defined as the number of SNAPs-related WHP programs (smoking, nutrition, alcohol or physical activity/sedentary behaviour) participated in during the previous three years. Respondents were asked to respond to this question if they had participated in one or more WHP program. †Weighted proportions are reported. ‡Unweighted numbers are reported. ¶PR (95% CI) = prevalence ratio (95% confidence interval), adjusted for age, sex, and education. §Trend: $p<0.05$. #Trend: $p<0.001$

Table 7.3 Results of Pearson Chi-square tests and descriptive statistics for respondents who agreed with statements relating to organisational commitment by levels of participation in SNAPS-related programs

	No participation*	Participated in one program*	Participated in two or more programs*	
	%†(n/N)‡	%† (n/N)‡	%† (n/N)‡	χ^2 (df=2)
I feel proud when I tell others I am part of my organisation				
Agree	69.0 (331/484)	79.3 (734/938)	84.9 (631/742)	47.9 ¶
Disagree/neither agree or disagree	31.0 (153/484)	20.7 (204/938)	15.1 (111/742)	
I would recommend my organisation as a great place to work				
Agree	55.0 (262/481)	63.0 (587/937)	76.4 (570/742)	71.5 ¶
Disagree/neither agree or disagree	45.0 (219/481)	27.0 (350/937)	23.6 (172/742)	
I feel a strong personal attachment to my organisation				
Agree	54.1 (260/484)	65.4 (607/936)	72.0 (736/740)	45.0 ¶
Disagree/neither agree or disagree	45.9 224/484)	34.6 (329/936)	28.0 (204/740)	
My organisation inspires me to do the best in my job				
Agree	50.6 (245/482)	58.3 (550/936)	67.8 (511/743)	41.3 ¶
Disagree/neither agree or disagree	49.4 (237/482)	41.7 (386/936)	32.2 (232/743)	
My organisation motivates me to help it achieve its objectives				
Agree	42.6 (205/482)	53.0 (495/937)	64.3 (489/742)	67.7 ¶
Disagree/neither agree or disagree	57.4 (277/482)	47.0 (442/937)	35.7 (253/742)	

*Participation defined as the number of SNAPS-related WHP activities (smoking, nutrition, alcohol consumption, physical activity and sedentary behaviour) participated in (yes/no) during the previous three years. †Weighted proportions are reported. ‡Unweighted numbers are reported. ¶ signifies p<0.001.

The proportions of respondents in each category of participation who agreed with the organisational commitment factors are presented in Table 7.3 above. The proportions of respondents who agreed with each statement were higher at each level of activity participation. As an example, 69.0% of respondents who reported no participation SNAPS-related programs agreed with the statement "I feel proud when I tell others I am part of my organisation", compared with 79.3% and 84.9% who had participated in one program and two or more programs, respectively. Pearson Chi-squared analyses on the unweighted proportions in the 2 x 3 tables for each engagement factor were significant ($p<0.001$).

Table 7.4 Weighted, age- and sex-adjusted ratios of mean values, or proportions, of lifestyle factors at two time points during the implementation of the Healthy@Work program for Tasmanian State Service employees

Lifestyle factor	Respondents (2010)	Respondents (2013)	Ratio (95% CI)†
Current smokers, % (n)	9.5 (322)	9.0 (288)	0.99 (0.98, 1.01)
Diet, Mean (SD)*			
Vegetable intake (cup equivalent/day)	2.7 (1.2)	2.8 (1.3)	1.01 (0.99, 1.04)
Fruit intake (cup equivalent/day)	1.8 (0.9)	1.8 (0.9)	0.98 (0.95, 1.00)
Alcohol (AUDIT-C‡ score), Mean (SD)	3.6 (2.4)	3.5 (2.4)	0.98 (0.94, 1.02)
LTPA¶ (mins/week), Mean (SD)	203.7 (226.9)	208.0 (237.8)	1.02 (0.93, 1.10)
Sitting at work (mins/typical day), Mean (SD)	270.0 (154.8)	262.6 (160.0)	0.97 (0.94, 1.00)
BMI (kg/m^2), Mean (SD)	26.6 (5.1)	26.6 (5.4)	1.00 (0.99, 1.01)

*Mean (SD) = mean (standard deviation). †Ratio (95% CI) = difference of means (95% confidence interval), adjusted for age and sex. ‡AUDIT-C = Alcohol Use Disorders Identification Test three item screen. ¶LTPA = leisure-time physical activity.

The ratios of mean values, or proportions, of health-related behaviours and BMI at the two survey points are presented in Table 7.4 above. In 2010 and 2013, 9.5% and 9.0% of respondents were current smokers respectively. These proportions are low compared to Australian and Tasmanian adult population health estimates. All other health characteristics (other than sitting at work which has no relevant comparison) were similar to general population estimates (52, 53). No significant differences

were found between any of the health-related behaviours, or BMI, measured in 2010 and 2013. For example, mean BMI (kg/m^2) was 26.6 (SD=5.1) in 2010 and 26.6 (SD=5.4) in 2013, with a ratio of 1.00 (95%CI 0.99, 1.01). Sensitivity analyses using unweighted data showed similar results.

7.5 Discussion

This study aimed to evaluate the health outcomes and benefits of a comprehensive WHP program devised around 'best available' evidence that was delivered in a large non-trial setting. Our research examined the relationship between participation in workplace health promotion activities and reported benefits of participation by employees in a diverse Australian public-sector setting, and differences between respondent health-related behaviours and BMI at two time points during the implementation of the whole-of-organisation initiative. We also investigated organisational commitment and participation in WHP activities. Participating in more types of activities was associated with a higher likelihood of respondents reporting a wide range of perceived benefits. Our findings also indicated strong and significant associations between measures of employee organisational commitment and participation in activities related to health-related behaviours. However, no differences were observed in lifestyle factors measured in 2010 and 2013. These findings demonstrate some positive intermediary outcomes from participation that were not ultimately reflected in differences in health-related behaviours and BMI.

Healthy@work was designed to be a comprehensive health promotion strategy, one element of which was to offer a range of different activities to address health-related behaviours and wellbeing. Our findings showed significant trends for participation in multiple types of activities and the likelihood of respondents reporting that participation made them motivated to quit smoking, be physically active, eat more healthily or drink less alcohol. With the exception of smoking cessation, participation was also associated with respondents agreeing that the activities helped them to address these lifestyle factors and improve their health. Similarly, significant trends were observed for participation and respondents agreeing that the activities helped them to reduce stress, lose weight, and improve their performance at work. Importantly, our findings showed significant dose

response relationships at each level of activity participation for all factors bar smoking cessation, alcohol consumption and losing weight, with respondents who took part in more types of activities increasingly more likely to agree that the activities were beneficial. These results provide broad evidence that participation in multiple WHP activities is related to a range of self-reported benefits, despite the heterogeneity of programs on offer across the agencies.

There are few known published studies that have directly reported on motivation to adopt or improve health-promoting behaviours as an outcome of participation in a comprehensive workplace health promotion program. It is important to better understand this relationship because being motivated, analogous to intention or readiness to change, is the most proximal measure of the stimulus to act beside actual behaviour change. Intention to change behaviour does not invariably lead to behaviour change, and an acknowledged intention-behaviour gap exists (54). Nevertheless, motivation to change is a moderate predictor of behaviour (55). A meta-analysis by Webb and Sheeran (56) of studies that examined subsequent behaviour change in interventions designed to positively affect intention to change behaviour concluded that intentions ultimately determine behaviour, but a moderate-large change in intention engendered more modest corresponding changes in behaviour. Our study reflects this relationship, with larger proportions of respondents agreeing that they were motivated to address key health-related behaviours, compared to the corresponding proportions of respondents who reported modifying those same behaviours.

Our results further demonstrated that respondents felt that participation in multiple activities had helped them to make positive changes in regard to their stress, job performance, weight, and all measured health-related behaviours except smoking. It was not surprising that there was no consistent relationship observed for smoking cessation. Previously, our group reported low readiness for smokers to stop smoking, even when they had indicated that smoking cessation was the most important thing they could do to improve their health, or prevent ill-health (37). Moreover, a review of workplace interventions for smoking cessation found no evidence of comprehensive workplace programs that target multiple risk-related

behaviours having an effect on smoking prevalence (57). It was notable, however, that reported reductions in stress and improved job performance were associated with participation in lifestyle behaviour-related programs. This is in line with Muse and colleagues (23), who concluded that when an organisation provides work-life benefits that employees use or value, including physical health support, a positive reciprocal exchange forms between employer and employee that can result in higher job performance. Furthermore, previous studies indicate a relationship between stress and health behaviours (58-60). Participation in activities that target these health behaviours may have had an attendant effect on employee stress.

Few studies have reported on self-reported benefits for health-related behaviours and participation, with the focus generally on anthropometric or questionnaire measurement of health factors and behaviours. Organisations, however, may value perceived benefits as valuable outcomes in their own right, as they can provide a strong indication that employees regard the worksite health programs on offer to have played a positive role in influencing their health behaviours (15, 61). This may be particularly the case in countries such as Australia where employee health insurance coverage is not incumbent upon the employer. In such instances there is less fiscal imperative to generate a return on investment in the form of employees meeting behavioural or risk factor markers to reduce insurance costs (62). In addition, self-reported benefits may represent an early signal of program effectiveness prior to measurable behaviour change. In reviewing key large-scale interventions, Goetzel and colleagues emphasise that it can take at least three years for a well designed and effectively implemented program to be accepted, and become entrenched and well-functioning before it may be possible to detect a discernable shift in employee lifestyle factors (6). Our results for the comprehensiveness of agency Healthy@Work programs reflect this time line.

In regard to outcomes of WHP that go beyond employee health, our research showed that participation in WHP activities was positively associated with organisational commitment. Due to the cross-sectional nature of the analyses we are unable to determine the direction of the relationship. Previous cross-sectional studies have found links between workplace health promotion and employee

organisational commitment (22, 25). Some researchers have speculated that investment by an employer into employee health and wellbeing is reciprocated by increased attachment to the organisation and job performance of employees, a view grounded in social exchange theory (25) and that a positive health climate could be cultivated, through strategies such as providing access to health promoting activities, supports and information, as a means of strengthening employee organisational commitment (24). Our findings extend those of previous studies by investigating participation in multiple types of WHP activities. While further longitudinal research is required, our results may provide preliminary support for an adjunct non-health outcome of WHP for those that engaged with the available health-related activities.

Despite promising indications of self-reported benefits from participation in different types of WHP activities, we did not observe any differences in lifestyle factors at the two survey points. Perhaps this should not be a surprising outcome: in a series of ongoing reviews of the effectiveness of comprehensive multifactorial health promotion based in US worksites, Pelletier (14) concluded with only 'cautious optimism' about program effectiveness. His reviews consider a range of designs from non-experimental with pre- and post-measures but no comparison group, through to randomised controlled designs. Pelletier also qualified the findings of the review by acknowledging a likely publication bias, whereby studies with non-significant results are not published, and therefore not eligible for inclusion in such evidence syntheses. This means that we are unlikely to learn about programs that do not achieve statistically significant changes in health-related behaviours or weight status while we hear about the programs that do, albeit modestly in most instances.

Healthy@Work was structured around best practice frameworks, and agency WHP facilitators were trained to deliver evidence-based activities using participatory strategies based on organisational and employee needs assessments. While there was evidence of increasing overall program comprehensiveness reported at an agency level and increased activity availability reported by employees (Figure 7.1 above), implementation and resourcing was unlikely to have been consistent across the government agencies of different sizes, such as health and education with many worksites spread across the state, or occur on the same time schedule. In effect,

different agencies and worksites are likely to have had varying 'doses' of Healthy@Work. Also, previous research has shown that some employees at higher risk of being in poor health as a result of suboptimal health-related behaviours chose not to engage in WHP, even though the greatest health gains might be achieved and observed in these groups (63, 64). Furthermore, even if all program factors were consistent and effective across the entire organisation, programs may take a number of year to be accepted, utilised, and become functionally operational before the desired outcomes may be achieved (6). Over a time frame of three years, our study only shows evidence of interim health-related outcomes for the implementation approach used for Healthy@Work, and no shift in employee health-related behaviours or BMI.

7.6 Limitations

The findings of our study should be considered within the context of the following limitations. Response bias may exist with self-report data, for example respondents may underreport negative or suboptimal behaviours, however validated population-surveillance measures were used to increase the probability that lifestyle factor estimates were accurate, and there was notable consistency in the measurements obtained at each survey. The associations reported in the study of employee self-reported benefits may represent common source bias given all the data came from the same self-reported question set. In addition, a respondent's positive experience of participation in one activity type might leave them more inclined to positively rate the influence of program participation over a broader range of health-related behaviours than were truly influenced. The specific measures used to assess organisational commitment have not been validated but are in common use in public-sector climate surveys, and comparable to statements operationalised in recent studies (28). Objective data regarding the work-site specific activities available to respondents was not collected routinely by the government agencies or worksites; neither did we have access to information regarding dose, fidelity, or the extent to which the activities adhered to evidence-based principles and an agency-level estimation of comprehensive program components, which included making activities and supports available. Knowing these limitations, we included in the

pH@W surveys a question relating to the activity types perceived by respondents to be available, and we were cautious to handle the availability and participation data conservatively. The grouping for participation data therefore is the equivalent of participation once for each type of activity. We managed the data in this manner to minimise potential reporting inaccuracies based on three-year recall and to address the current study's focus on breadth of program participation, which is consistent with the aims of Healthy@Work and comprehensive WHP, in general, to address multiple behaviours. If dose were considered we may have seen stronger associations. Finally, we used a repeated cross-sectional design to compare lifestyle factors, which is only one of a number of techniques available for the evaluation of natural experiments such as Healthy@Work. For example, an interrupted-time series design would have been useful to help distinguish intervention effects from secular trends, however it was not feasible in this context to deliver the necessary multiple surveys prior to and after Healthy@Work for this technique.

A strength of the study was the random stratified sampling technique we were able to adopt due to the partnership with the Tasmanian State Service. Through this partnership we were granted access to administrative data for the entire TSS workforce, from which the sample drawn. We were thus able to weight for non-response, which helped to address the possibility of response bias due to the low response rates for each survey, and for our findings to be more generalisable to the Tasmanian State Service. Further strengths of the study were the large sample sizes, and the novelty of a pragmatic investigation into comprehensive WHP implemented in a large and diverse multi-site public sector, and non-trial, setting.

7.7 Conclusion

In conclusion, our study employed population surveillance techniques to estimate differences in lifestyle factors in an employee population exposed to a 'real-world' comprehensive WHP program. We also investigated self-reported benefits from participation in WHP activities and employee organisational commitment. Agency-level program comprehensiveness increased for all agencies, and employees reported more activities were available to them, between 2010 and 2013. Participation in SNAP-related activities was associated with benefits such

respondents feeling they were motivated and assisted to improve a range of lifestyle factors, however population-level differences in lifestyle factors were not observed between the two surveys. In spite of some positive signs of perceived benefits to employees and outcomes of interest to employers, Healthy@Work was either ineffective for significant lifestyle factor change, or implementation of a comprehensive WHP in a large and diverse organisation may require longer time frames before shifts in the population health profile might be observed. Expectations for health-related behaviour change as a result of programs such as Healthy@Work should be modest in the short term. Organisations may, however, value and strive for other or additional outcomes, including engaged employees, or workers who feel supported in adopting healthier behaviours.

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Chapter 8

Discussion

Chapter 8. Discussion

8.1 Background summary and aims of thesis

Cigarette smoking, poor diet, risky alcohol consumption, overweight and obesity, physical inactivity and sedentary behaviours, are adverse lifestyle factors associated with non-communicable diseases (1, 2), and premature mortality (3-5). Evidence from experimental and quasi-experimental workplace health promotion (WHP) interventions has shown that workplaces can be viable settings for helping employees to make improvements to lifestyle factors (6-10). It is less clear what happens outside of controlled trials, when organisations attempt to implement WHP underpinned by best-evidence principles. There is a need for pragmatic program evaluations that investigate the translation of commonly advocated implementation strategies in practice, as well as program outcomes and shifts in the health profile of the employee population (11-13). An increased understanding of these factors would allow organisations to discern realistic organisational and employee outcomes, with practicable strategies and time-horizons to improve the likelihood of achieving the anticipated outcomes.

The aims of this thesis were therefore to investigate employee participation in, and the benefits of Healthy@Work, a comprehensive workplace health promotion (WHP) program implemented in a large and diverse Australian public-sector setting. Of particular interest was the relationship between implementation strategies and employee participation in activities, and employee lifestyle factors including sitting at work. The specific aims were:

- To investigate whether employee needs assessments align with employee preferences for optimising their health or preventing ill health.
- To investigate the associations between prolonged sitting at work and psychological distress.
- To investigate factors associated with the availability of, and participation in, workplace health promotion activities related to health behaviours.

- To investigate employee barriers and facilitators to participation in health-related activities.

- To investigate employee self-reported benefits from participation, employee organisational commitment, and employee lifestyle factors.

8.2 Summary of results

Using well-established epidemiological processes to help to evaluate a large-scale WHP program, the research presented in this thesis represents a valuable contribution to increasing the understanding of workplace health promotion in a 'real-world' setting. Measuring the health profile of two cross-sectional samples of Tasmanian State Service (TSS) employees, regardless of levels of participation in or exposure to workplace health promotion (WHP) activities, was designed to measure changes that may be in part attributable to Healthy@Work. This meant that signals from organisational-level changes to culture, policies and infrastructure, the measurement of which was beyond the scope of this thesis, might be captured, not just from activity participation. The chapters exploring implementation practices each have their own 'outcomes' but together help to explain some of the strengths and weaknesses in Healthy@Work's WHP activity implementation and employee engagement, contextualising the lifestyle factor findings in the final chapter. With regard to implementation, the findings indicated employee needs and health risk assessments are likely to align with employee-prioritised perceptions of the most important changes they could make to improve health, or prevent ill-health. Physical activity, diet and losing weight were the prevalent choices, with physical activity a popular target with both physically active and inactive respondents. Many respondents were ready to, or were currently trying to address their nominated health change target, with the exception of smoking cessation, changes to work factors, and reducing alcohol intake. Overall, the availability of WHP activities increased between 2010 and 2013, however inequitable access to activities, and lower levels of participation in some at risk groups, was evident. Current smokers, and respondents reporting cardiometabolic conditions or variable work schedules, were less likely than those in the respective reference categories to participate in

multiple activities. Conversely, only administrative staff or respondents in the highest category of leisure-time physical activity were more likely to participate in more than one type of activity. Common barriers to participation included time, health problems, location of activities and scheduling conflicts for part-time and shift workers. However, commonly recommended implementation practices, such as respondents perceiving they were consulted in the design of activities, that the activities were relevant, interesting, convenient, helpful, and there was support to participate from managers and colleagues, were related to participation in more types of activities.

For lifestyle factors, prolonged sitting at work was found to be associated with intermediate levels of psychological distress, independent of leisure-time physical activity. Participation in more types of activities was associated with a range of employee-perceived benefits, such as being motivated or assisted to address health-related behaviours. Respondents were more likely to report that participation made them motivated to quit smoking, be physically active, eat more healthily or drink less alcohol if they had participated in multiple activity types, and with the exception of smoking cessation, participation was also associated with respondents agreeing that the activities helped them to: address these lifestyle factors; improve their health; reduce stress; lose weight; improve their performance at work. Moreover, a significant association was found for greater participation in activities and measures of employee commitment to their organisation. In spite of some indications of program value to employees and the organisation, there were no observed differences in the employee-population lifestyle risk factor profiles measured in 2010 and 2013.

8.3 Limitations

The findings of this thesis should be considered in the context of some limitations, the majority of which have been previously considered in Chapters 3 to 7. In summary, a limitation was that the analyses were cross-sectional; thereby, the direction of associations was uncertain for many of the studied factors. In addition, this research was primarily reliant on self-report data. Availability and participation data may have been subject to recall bias, and recency effect, where more recently

available activities tended to be recalled better than those that may have been offered in the early stages of Healthy@Work. Bias would likely result in an underestimation of what was available, particularly for those who did not participate in a certain activity type, or at all. Where feasible, researchers and organisations might consider more frequent reviews of programs and activities to reduce the possibility of this effect. Further, while annual aggregate agency data was collated by agencies to audit Healthy@Work progress, agencies did not routinely collect objective data that detailed specific WHP activity, policy, environmental and program implementation information for individual worksites. Particularly in larger agencies with numerous worksites, policy changes to promote health and wellbeing, as an example, may be evident to employees in the central worksites, but not be reflected in the experience of employees in more disparate worksites within that agency. In the absence of objective site-specific data, employees were surveyed by *partnering*Healthy@Work to ascertain their perceptions of activity availability and implementation strategies. For some respondents it is possible that programs were available, or implementation strategies were applied, that were not apparent to employees due to poor communications strategies or other implementation deficiencies. Future research might overcome this limitation by encouraging and supporting organisations to customarily collect valid and reliable objective program data for all work sites. This would allow comparison between objective and subjective assessments of WHP program elements.

Another potential limitation was the broad investigation of activities that related to lifestyle factors ('SNAPS-related activities') rather than separate categories of activities relating to particular lifestyle factors. Grouping the WHP activities in this manner was effectively a count of the types of SNAPS-related activities an employee had reported available or participated in. Agency programs needed to accommodate various employee health needs and activity preferences, occupations, work demands and work schedules. This gave rise to heterogeneous activities available across the state service. Inevitably, available activities had different lifestyle-factor foci, with differing delivery modalities and program intensities. As acknowledged by Seaverson and co authors (14), it is inherently difficult to standardise and compare WHP

tailored to organisations, or in this case separate agencies and worksites. The TSS, prior to the partnership commencing, conducted employee health surveys and agency needs assessments. The goal was to help agencies identify the health needs of the employees, and choose what the agencies would focus on in their WHP program design. It was outside of the scope of this thesis to assess if activities met and addressed the health needs of the employees across the 1500 or so TSS worksites, or the competency of the agency WHP facilitators. Categorising activities as a count of the SNAPS-related activities available did result in a loss of specificity that may have been gained by analysis across individual lifestyle factor activity types, but did overcome challenges presented by the heterogeneity of activity offerings.

A further consideration is that the participation data are related to the number of SNAPS-related activities respondents participated in, and not participation dose. Activities targeting the various lifestyle factors would entail different levels of participation that would not be equivalent. Participating once in an activity might represent a full 'dose' of that particular activity, where in another it might represent very low participation. Investigations of participation in SNAPS-related activities as a count of the types of activities respondents participated in allowed more meaningful comparison of participation across the different activity types. Overall, therefore, the research in this thesis was concerned with the breadth of Healthy@Work reach, and participation, rather than specific activity types. Evaluating the outcomes of a comprehensive WHP program of the scale of Healthy@Work, that had both a settings and an individual behaviour change emphasis, is admittedly challenging, particularly in the relatively short time frame to measure shifts in population-level outcomes. While the focus has been on WHP activities related to lifestyle factors, it is important to acknowledge that environmental, cultural, policy and procedural elements to enhance employee health and wellbeing were also championed through Healthy@Work. These were not directly studied in this thesis, yet an advantage of a population prevalence technique to assess differences in employee lifestyle factor profiles is that it captures the impact on health-related behaviours, if any, from of all aspects of a WHP program.

8.4 Implications for workplace health promotion

8.4.1 Occupational sitting

Sedentary behaviour is now well recognised as being detrimental to physical health (2, 15). The investigation presented in Chapter 4 of this thesis for associations between time spent sitting at work and psychological distress was at the time of publication one of the first known published studies into occupational sitting and mental health. Subsequent research has provided further additional support for sedentary behaviour having an adverse association with mental health (16-20), however prospective investigations are required in general, and in the occupational setting, using objective measurement of sedentary behaviour where feasible. The strength of the evidence for the physical health implications of sedentary behaviour are sufficient for organisations to address prolonged occupational sitting as an important health and safety concern (21), to protect the physical and, possibly, the mental health of employees.

8.4.2 Did Healthy@Work 'work?'

The findings of this thesis have implications for workplace health promotion implementation in practice, including how organisations value and evaluate program outcomes. Healthy@Work was a comprehensive multi-component program that secured significant financial and high-level organisational backing, was devised around sound WHP principles, and implemented over a number of years with the assistance of centralised support. Despite these sound intentions, this research found that a shift in the health profile of Tasmanian State Service employees was not observed between the two surveys. The research highlights the importance of organisations establishing clear and realistic program expectations, and dedicating sufficient time, resources and effective implementation strategies to try to realise them, before a program's success can be judged (13).

In Chapter 1, risk factor and disease status change or prevention were conceptualised to occur at the end of a continuum of intermediary outcomes (Figure 8.1 below). The work presented in this thesis assessed interim elements along this pathway. Employees reported on a range of indicators of program value, each of which might be considered valuable stand-alone results depending on the

designated program goals (13). Reviewing the elements can reveal, for Healthy@Work and other similarly conceived programs, why more distal outcomes may or may not have been achieved, or forecast the likelihood of them being reached in the future.

The following section presents a summary of the degree to which the various elements of the proposed pathway appear to have been achieved in Healthy@Work, and the implications for organisations implementing and managing similar WHP programs.

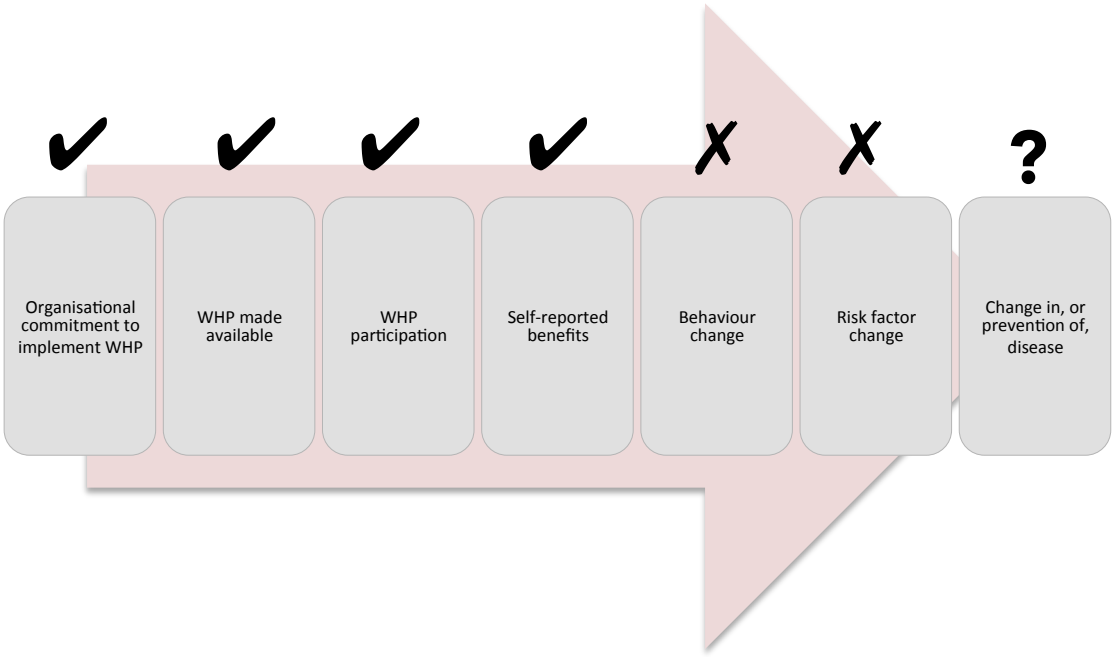

Figure 8.1 Continuum of WHP objectives

Organisational commitment to implement WHP. Healthy@Work achieved overarching commitment from high-level management of the TSS, including the Premier at the time, the elected head of the Tasmanian State Government. There are two components to consider when assessing 'organisational commitment' in this setting; mandated program implementation by agencies, and worksite-level commitment. First, agencies were required to implement Healthy@Work programs. It is reasonable to assume that there were differing levels of readiness and commitment for each agency at the commencement of Healthy@Work. Indeed, some agencies were already actively involved in WHP when Healthy@Work was

initiated (Chapter 7). These agencies may have been more advanced in terms of organisational health culture (22) and activity availability, and better placed to readily engage with Healthy@Work .

Second, in large and diverse organisations like the Tasmanian State Service, comprehensive organisational commitment to integrate a sustainable health and wellbeing promotion requires support from managers at each worksite (23, 24), particularly when worksites are separate or remote to centralised agency administration (25). The extent of commitment to implement Healthy@Work across the TSS at the worksite level was not objectively measured, but again was likely to be variable given the approximately 1,500 individual TSS worksites. The process evaluation indeed highlighted that Healthy@Work received head of agency support, but that middle management was harder to engage. In larger agencies with multiple worksites this would affect the time required for the trained agency Healthy@Work facilitators to earn managerial support across all sites, before programs and activities could be fully established.

Availability of SNAPS-related WHP activities*.* While agencies overall offered increasingly comprehensive WHP between 2010 and 2013 (see Chapter 7), the research in this thesis found evidence of differences across a number of factors in the number of activity types employees perceived were available to them, and a city- or head office-centric bias was perceived by some respondents. These findings are supported by the findings of the process evaluation conducted by other researchers in the partnership. Key informants interviewed for the process evaluation similarly reported that shift- and itinerant-workers, employees in remote locations, or very small work groups were disadvantaged in terms of accessing WHP activities. In particular, employees from the two largest agencies, the Department of Health and Human Services and the Department of Education, each with over 200 worksites, were less likely to report more activities were available. This highlights the time horizons required to extend a WHP program across manifold work sites, where health and education frontline employees are characterised by having less flexibility and discretion in workload management, and health workers additionally by irregular- or shift-work patterns. Broader activity implementation for smaller or

single-site agencies was evidently more feasible within the Healthy@Work time frame.

Participation in SNAPS-related WHP activities. There was evidence that many employees participated in at least some SNAPS-related activities, but participation was variable. Some at risk groups, such as smokers, were less likely to participate. Key informants in the process evaluation also expressed that employees most in need did not participate. Many of the barriers to participation commonly identified in the literature were apparent, however respondents were more likely to participate in multiple activity types if key elements of recommended program implementation, including participatory strategies, were perceived by employees to have been used.

Self-reported benefits from participation in WHP activities. The more SNAPS-related activities respondents participated in the more likely they were to report benefits for managing lifestyle factors, stress and job performance. These results represent some value from activities to employees who did participate, and encouraging indications of program engagement and worth for the organisation (26).

Health-related behaviour and risk factor change, and change in, or prevention of disease. That there were no observed aggregate differences in health-related behaviours, and thus also lifestyle risk factors status, between the two surveys, is perhaps not surprising. Despite the acknowledged limitations of the cross-sectional design, self-reported data, and the low response rate to the surveys, there are sufficient signals from the series of cross-sectional studies presented in this thesis, supported by the findings of the Healthy@Work process evaluation, that implementation and uptake of WHP activities related to lifestyle factors across the TSS was patchy. Moreover, some employees in at risks groups for health behaviours, where the greatest health gains might be achieved, were less likely to participate. Nevertheless, some interim successes were evident, and it is important to flag that WHP activities were only one strategy used by the TSS to promote employee health and wellbeing in its broader organisational-level, settings approach to WHP.

However, projecting along the continuum from these results, employee population-level disease status change would appear unlikely. The approach taken by Healthy@Work was either ineffective in regard to achieving measurable lifestyle factor change, or insufficient time had elapsed for programs to 'work' and for a shift in the employee population lifestyle factors to be detected. Whether or not an organisation views results like these as evidence that a program has failed depends on the expected outcomes, and organisations should be clear when assessing the motivations behind investing in a program.

8.5 Additional or alternative benefits of workplace health promotion

In contrast to workplace health randomised controlled intervention trials, which tend to be on much smaller groups of employees in more controlled and closely documented interventions, and thus can more easily tease out intervention effects in shorter time frames, it has been estimated that it may take three to eight years before it is possible to detect a population-level effect of an effectively implemented evidence-based comprehensive workplace health promotion program targeting a large employee population (13, 27). Organisations in general, but the public sector in particular, may have difficulty reconciling distal or difficult to measure outcomes with more immediate program expenditure and dedication of human resources. The emphases of the research included in this thesis has been on lifestyle factors, activities related to lifestyle factors and risk factor change, however there are other environmental, cultural and less demonstrable employee benefits that may be considered outcomes sufficient enough to warrant workplace health promotion (26).

Internationally, the reasons that an organisation might engage with and implement WHP can differ markedly. In the United States the provision of employee health coverage has largely fallen to employers due to the absence of a universal health care system (28). Therefore US-based organisations are more likely to use WHP as an employee health management tool, with the goal to reduce health cover costs and maximise return on investment against the cost of programs (29). Aldana (30) argues that for the expenditure of human and financial resources to be warranted, health, productivity and cost saving outcomes should be achieved.

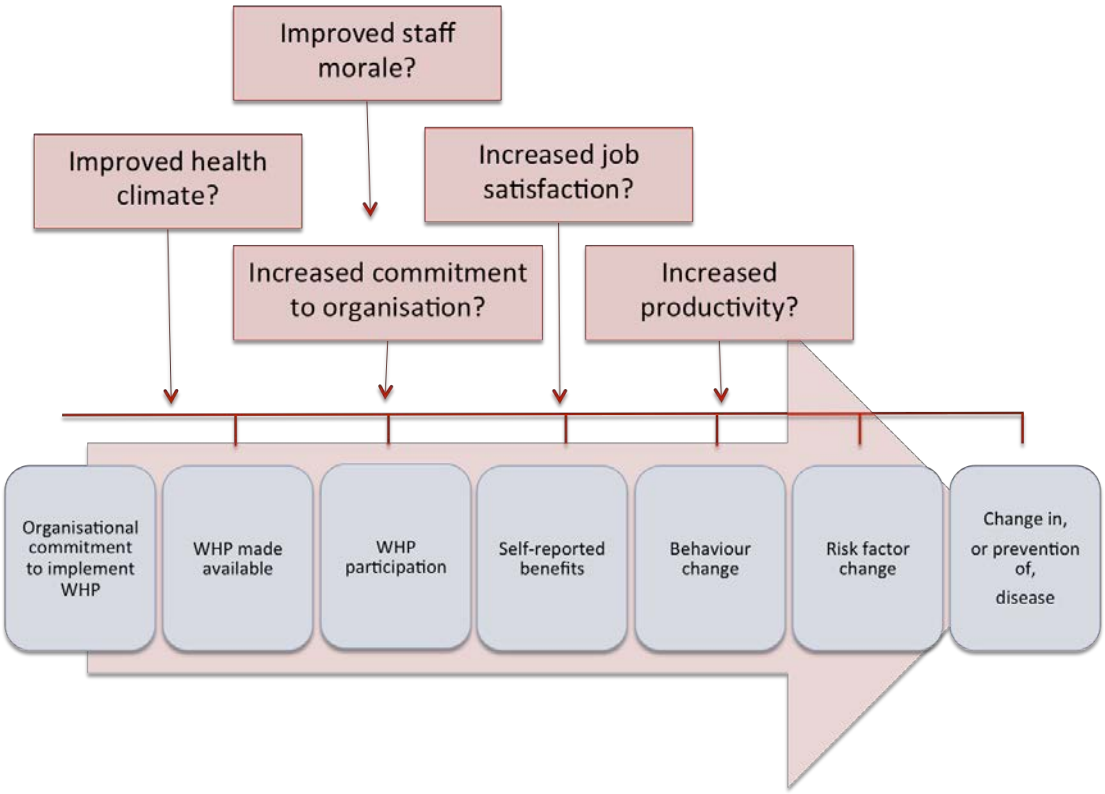

Figure 8.2 Additional interim benefits of workplace health promotion

Organisations outside of the United States, in universal health care settings where health care services are provided by government, can be motivated to implement health and wellbeing programs by a number of additional or different drivers (see Figure 8.2 above) to minimise staff turnover (31, 32) increasing employee engagement (33) and commitment to the organisation (22); and enhance productivity outcomes (34, 35) such as reducing presenteeism (defined as being present at work, but limited in some aspects of job performance by a physical or mental health problem) (36, 37) and absenteeism (38-40). For example, productivity loss and absenteeism have been associated with adverse lifestyle behaviours and obesity (41-43). Alternatively, adherence to multiple optimal health behaviours (being physically active, not smoking, having sufficient sleep, and meeting guidelines for nutrition and alcohol consumption) has been linked to reduced productivity loss (44).

The aforementioned motivations are often presented as fiscal incentives for organisations to implement WHP. Yet numerous factors relating to employer WHP

engagement have been identified that go beyond those that can be monetised (13), such as recognition by the employer of the importance of employees as a resource to be nurtured (45). Some identify an ethical obligation to foster the health of their employees (46). WHP may be implemented by an organisation due to a belief that that promoting employee health and wellbeing is accepted and expected work practice - that it is 'the right thing to do' - rather than driven by evidence linking workplace health climate to health or productivity outcomes (30). Organisations can place value on structuring work and the workplace to create an enabling environment for health promoting behaviours so that already the healthy can remain so, and others are encouraged to adopt healthier behaviours (enhancing organisational health climate, see Figure 8.2 above)(47, 48). Indeed, Pronk (26) argued that many organisations committed to WHP regard broader motivations to be more inherently valuable, including enhanced employee job satisfaction and staff morale, and commitment to the organisation, than reasons that have purely financial bases. Findings reported in this thesis found an association between participation in WHP activities and employee commitment to their organisation. Although the direction of the relationship is not discernible, the Tasmanian State Service would likely regard this as an outcome of interest.

The question remains whether less tangible outcomes such as employee commitment to the organisation are permissible or sufficient as standalone WHP objectives in the public-sector context. Public-sector organisations like the Tasmanian State Service are accountable to the Government and public they serve for the efficient utilisation of public resources (49), and must be cognisant of this when delivering health promotion to their own workforces. Similar to the administration of public sector services and programs in general, there is typically an expectation that expenditure of public resources will be justified by the realisation of the desired outcomes. These outcomes could be measureable improvements to employee health or lifestyle behaviours, or productivity gains achieved through reduced absenteeism and presenteeism, staff turnover or early retirement. However, there is arguably less flexibility within the public sector to finance programs for more nebulous and difficult to measure cultural or health climate

outcomes. In contrast, discretionary investment into health and wellbeing employee programs by a private organisation can see that organisation recognised as an employer of choice (50, 51).

8.6 Summary of recommendations for workplace health promotion

The research presented in this thesis was designed to address questions relevant to the partner organisation, the Tasmanian State Service (TSS), and to make a practical contribution to the way in which the TSS and other organisations might understand, implement and manage ongoing workplace health promotion efforts. The *partnering*Healthy@Work team collaborated with TSS colleagues at all stages, from research conception to manuscript preparation, to identify applied research questions and practical recommendations stemming from the findings. Table 8.1 below presents a summary of the key findings and recommendations. The recommendations are based on the current literature and the findings in this thesis. The recommendations come with the caveat that workplace health promotion research is still progressing, and that the merits of the various methods of implementation and evaluating effectiveness continue to be debated. Despite this, however, organisations are running programs and seeking advice on how best to do so. The recommendations are believed to be reasonable and broadly applicable to the majority of workplace health promotion initiatives, but particularly those set within large and diverse, multi-site organisations.

Table 8.1 Summary of findings and practical recommendations

What employees want, need, and are ready to change (Chapter 3)	
Key findings	Recommendations
• Employee perceptions of their own health needs broadly corresponded to their health-related behaviours, weight status, and stress.	• It is recommended that organisations conduct employee needs assessments and surveys of employee program preferences. The specific employee health-related behaviours and interests identified are likely to overlap.
• Most employees were ready to change, or were already making changes, to their identified health change target.	• Provide targeted activities based on what employees say what they would most like to change to improve their health, or prevent ill health, to engage already motivated employees.
• Physical activity was the most popular health change target.	• Offer physical activity interventions. They are likely to be well received, irrespective of risk-related lifestyle factors, and could be used to engage employees and build the profile of a program.
• Most smokers nominated smoking as their health change target, but the majority was not contemplating smoking cessation in the near future.	• Make smoking cessation support available because of its importance for employee health, however low or variable participation should be anticipated.

Sitting at work and psychological distress (Chapter 4)	
Key findings	Recommendations
• The study found an association between occupational sitting and intermediate levels of psychological distress, independent of leisure-time physical activity.	• Organisations need to intervene to reduce and break up the time employees spend sitting at work, based on the strength of the evidence linking sedentary behaviour to poor physical health outcomes, and emerging results for mental health.
Factors associated with activity availability and participation (Chapter 5)	
Key findings	Recommendations
• Females, older or obese employees were all less likely to report activities were available to them.	• Organisations should offer programs relevant to these groups, and focus on effective communication strategies to ensure that there is full awareness of all available activities.
• Older workers more likely to participate, after reported activity availability was taken into account.	• It is recommended that organisations provide activities and supports that are suitable and accessible to the entire age range of workers, to optimise the health and work ability of an aging workforce.
• Employees from the departments of Health, Education, and agencies with 6 or more worksites were less likely to report activities were available.	• Organisations need to allocate adequate time and resources to program implementation, if access to activities is to be equitable across large, multi-worksite organisations.

• Physically active respondents were more likely to have participated in more activities.	• It is recommended that organisations clarify whether the expenditure associated with a WHP program is justifiable if WHP is likely to engage already active or relatively healthy employees.
• Health department employees and respondents with variable work schedules were less likely to participate.	• Organisations should provide access to telephone- or internet-based supports to overcome accessibility issues.

Barriers and facilitators to participation (Chapter 6)	
Key findings	Recommendations
• Commonly recommended facilitating and cultural factors designed to enhance participation were associated with higher levels of participation.	• Consult employees when planning programs, to make the activities relevant, interesting, convenient, to encourage participation. • Build managerial and team support for a WHP program, to encourage participation.
• Being too busy at work, or having commitments outside of work, were associated with lower levels of participation.	• Organisations should support employees to have flexibility to participate during work hours, or provide access to activities on non-work days for shift/part-time workers.
• Shift or rostered work, and working in a remote or non-central location, were additional identified barriers to participation.	• It is recommended that different modes of activities are offered (e.g. internet, telephone or web-based support), and local services for remote employees, to help overcome time, work schedule or location barriers. • Multi-site organisations need to extend

	programs beyond the central administrative or city-based offices.

Benefits of workplace health promotion (Chapter 7)	
Key findings	Recommendations
• Respondents who participated in more health behaviour-related activities were more likely to report being motivated or helped to address lifestyle factors, including stress, and helped to improve job performance.	• Encouraging participation in multiple types of health-related activities may have benefits beyond improving health behaviours. • Measure motivation or assistance to change health behaviours as standalone program outcomes, or as intermediate markers of program engagement and effectiveness.
• A significant association between participation and employee organisational commitment was found.	• Clarify if cultural or alternative benefits from WHP are sought, whether the outcomes are measurable, and if they need to be measured to justify a program's implementation.
• Differences in employee health-related behaviours and BMI were not observed between 2010 and 2013.	• Organisations should decide if employee lifestyle factor change is an expected and necessary outcome of WHP to justify program expenditure. • It is recommended that organisations have modest expectations of improvements to health-related behaviours and BMI in the short term.

8.7 Recommended directions for future research

- Long-term studies with multiple or longer follow up periods are needed for multi-component organisational-level interventions such as Healthy@Work, where longer time horizons are needed to capture more distal outcomes, if they are realised. It is recommended that short annual surveys of key factors of interest to employers be conducted for at least 3-5 years, remaining mindful of budget constraints and over-burdening employees with surveys.

- Longer-term studies are also needed to follow up the sustainability of programs like Healthy@Work, to assess the longevity of programs beyond the initial, more intensively resourced, implementation phase, and investigate the factors associated with program endurance.

- More research is needed using objective data for WHP activity delivery and implementation techniques for similar pragmatic investigations of large-scale and diverse initiatives. Further, records of health-driven modifications to the work environment, procedures, and policies would be useful to evaluate the effect these changes have on employee health and wellbeing, and organisational outcomes.

- A challenge in non-trial settings is to design feasible data collection methods that may be performed by employees for an individual worksite. Data collection practices need to be relatively unburdensome and practical for normal organisational activity yet valid and reliable for research purposes. Ideally, researchers and partner organisations should work from the outset to design robust but practicable measures for collection of data specific to each worksite. Sound objective data would help researchers and partners to better evaluate programs and program outcomes outside of controlled trial settings.

- More research is needed into sitting at work and mental health, with a continued focus on sedentary behaviour interventions in the workplace, and the effects on physical and mental health outcomes.

8.8 Conclusion

With regard to implementation strategies, the findings from this thesis support strategies that involve employees in planning and tailoring workplace health promotion activities related to health behaviours. The findings from this thesis also show that prolonged occupational sitting is associated with intermediate levels of psychological distress. Despite observed intermediary benefits for those who did participate in activities, Healthy@Work was either ineffective in regard to achieving measurable behaviour change, or insufficient time had elapsed to detect a population-level shift. Organisations administering WHP should establish clearly defined outcomes and appropriately match expectations of, and resources and time frames to, realising those outcomes.

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Appendix 1. 2010 *partnering*Healthy@Work Survey

ID NUMBER: _____

HEALTHY@WORK QUESTIONNAIRE

This questionnaire asks for some general information about you, as well as some information about your physical and emotional health, your diet and physical activity, and your employment.

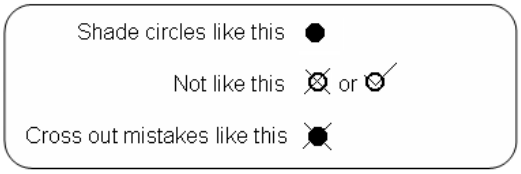
Instructions: Please read carefully

Please answer all questions to the best of your ability (leave blank if unknown).

Your answers will be completely confidential.

Indicate your response by filling in the circle next to the most appropriate answer.

Example:



or by writing clearly using the boxes where provided.
Please use BLOCK LETTERS where required.

Example: | | 4 | / | | 3 | / | 2 | 0 | 1 | 0 |

Cross out any mistakes and write the correct answer just below the relevant boxes.

Please use a black or blue pen if possible.

SECTION A

This section asks you some general questions about yourself.

1. Today's date: ☐☐ / ☐☐ / ☐☐ (dd/mm/yy)

2. Your date of birth: ☐☐ / ☐☐ / ☐☐ (dd/mm/yy)

3. What is your sex? ○ Male ○ Female

4. What is your current marital status?

- ○ Single
- ○ Married
- ○ De facto
- ○ Separated/Divorced
- ○ Widowed

5. What is the highest level of education you have completed? (Select only one)

- ○ Primary school
- ○ Year 7, 8 or 9 or equivalent
- ○ Year 10 or equivalent
- ○ Year 12 or equivalent
- ○ Trade/apprenticeship *(e.g. hairdresser, chef)*
- ○ Certificate/diploma *(e.g. child care, technician)*
- ○ University degree
- ○ Higher university degree *(e.g. Grad Dip, Masters, PhD)*

6. a) What would you say is the single most important thing you personally could do to improve your health or reduce your risk of getting sick? Write on the line below.

_____

b) For this change, which one applies to you now?

- ○ I am not thinking of making this change
- ○ I am thinking about making this change, but not in the next fortnight
- ○ I am thinking about making this change in the next fortnight or so
- ○ I am trying to make this change at the moment

SECTION B

These questions are about your diet and smoking tobacco.

1. How many serves of vegetables (excluding potatoes) do you usually eat each day? ***(One serve = ½ cup cooked vegetables or 1 cup of salad vegetables)***

○ 1 serve or less ○ 2 serves ○ 3 serves ○ 4 serves ○ 5 serves ○ 6 or more serves

○ Don't eat vegetables

2. How many serves of fruit do you usually eat each day? ***(One serve = 1 medium piece of fruit or 1 cup of diced pieces)***

○ 1 serve or less ○ 2 serves ○ 3 serves ○ 4 or more serves

○ Don't eat fruit

3. How many times do you eat red meat in an average week, including sausages, luncheon meat, salami, meat pies, hamburger or bacon (but not including fish or poultry)?

○ Ten or more times per week
○ Five to nine times a week
○ Three to four times a week
○ Once or twice a week
○ Less than once a week
○ Never

4. How often do you eat fish or seafood in an average week?

○ Six or more times a week
○ Three to five times a week
○ Once or twice a week
○ Less than once a week
○ I never eat fish for medical reasons
○ I never eat fish for religious or ethical reasons
○ I never eat fish for other reasons *(please specify)*_____

5. How many times per week would you usually eat hot takeaway meals? (e.g. pizza, burgers, fried or roast chicken, Chinese/Indian/Thai takeaway)

○ I don't eat takeaway
○ 1 meal or less per month
○ 1 meal per week
○ 2-3 meals per week
○ 4-5 meals per week
○ 6-7 or more meals per week

4

6. What type of milk do you <u>usually</u> consume?

- ○ Condensed
- ○ Full cream (normal milk)
- ○ Almost equal amounts of full cream and reduced fat
- ○ Reduced fat
- ○ Skim
- ○ None
- ○ Other *(please specify)*_____

7. How often do you add salt to your food <u>after</u> it is cooked?

- ○ Never
- ○ Rarely
- ○ Sometimes
- ○ Almost always
- ○ Always

8. How often do you have a drink containing alcohol?

- ○ Never **(skip to Q.11)**
- ○ Monthly or less
- ○ 2 to 4 times a month
- ○ 2 to 3 times a week
- ○ 4 or more times a week

9. How many standard drinks do you have on a typical day when you are drinking? *(Please refer to the Standard Drink Guide on the next page for examples of standard drinks).*

- ○ 1 or 2
- ○ 3 or 4
- ○ 5 or 6
- ○ 7 to 9
- ○ 10 or more

10. How often do you have 5 or more standard drinks on one occasion?

- ○ Never
- ○ Less than monthly
- ○ Monthly
- ○ Weekly
- ○ Daily or almost daily

11. Over your lifetime, have you smoked <u>at least 100 cigarettes</u> or a similar amount of tobacco?

○ Yes **(Answer Q.12)** ○ No **(Skip to Section C)**

12. Have you ever been a <u>daily</u> smoker?

○ Yes ○ No **(Skip to Section C)**

12a) At what age did you start smoking <u>daily</u>?

☐☐ years

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12b) How often do you <u>now</u> smoke cigarettes, cigars, pipes or any other tobacco products?

- ○ Daily **(Skip to Section C)**
- ○ At least weekly (but not daily)
- ○ Less often than weekly
- ○ Not at all

12c) At what age did you finally <u>stop</u> smoking daily?

☐☐ years

Source: Australian Government Department of Health and Ageing

4. Again, think about only those physical activities that you did for **at least 10 minutes** at a time**.** During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads as part of your work? *Please DO NOT include walking.*

_____ days per week

○ No moderate job-related physical activity ➔ ***Skip to question 6***

5. How much time did you **usually** spend on one of those days doing **moderate** physical activities as part of your work?

_____ hours per day
_____ minutes per day

6. During the last 7 days, on how many days did you walk for **at least 10 minutes** at a time as part of your work? Please do not count any walking you did to travel to or from work**.**

_____ days per week

○ No job-related walking ➔ ***Skip to PART 2: TRANSPORTATION***

7. How much time did you usually spend on **one** of those days **walking** as part of your work?

_____ hours per day
_____ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you travelled from place to place, including to places like work, stores, movies, and so on.

8. During the last 7 days, on how many days did you travel **in a motor vehicle** like a train, bus, car, or tram?

_____ days per week

○ No travelling in a motor vehicle ➔ ***Skip to question 10***

9 How much time did you **usually** spend in a motor vehicle on **one** of those days?

_____ hours per day
_____ minutes per day

Now think only about the cycling and walking you might have done to travel to and from work, to do errands, or to go from place to place.

10. During **the last 7 days**, on how many days did you **cycle** for **at least 10 minutes** at a time to go from place to place?
_____ days per week

○ No bicycling from place to place ➔ ***Skip to question 12***

8

11. How much time did you usually spend on **one** of those days **cycling** from place to place?

_____ **hours per day**
_____ **minutes per day**

12. During the last 7 days, on how many days did you **walk** for **at least 10 minutes** at a time to go from place to place?

_____ **days per week**

○ No walking from place to place ➔ ***Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY***

13. How much time did you usually spend on **one** of those days **walking** from place to place?

_____ **hours per day**
_____ **minutes per day**

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

YARD WORK:

14. Think about only those physical activities that you did for at **least 10 minutes** at a time**.** During **the last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, or digging in the garden or yard?

_____ **days per week**

○ No vigorous activity in garden or yard ➔ ***Skip to question 16***

15. How much time did you usually spend on **one** of those days doing **vigorous** physical activities **in the garden or yard?**

_____ **hours per day**
_____ **minutes per day**

16. Again, think about only those physical activities that you did for at least 10 minutes at a time**.** During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ **days per week**

○ No moderate activity in garden or yard ➔ ***Skip to question 18***

17. How much time did you usually spend on one of those days doing **moderate** physical activities **in the garden or yard?**

_____ **hours per day**
_____ **minutes per day**

HOUSEWORK

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ days per week

○ No moderate activity inside home ➔ ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. How much time did you usually spend on one of those days doing **moderate** physical activities **inside your home?**

_____ hours per day
_____ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ days per week

○ No walking in leisure time ➔ ***Skip to question 22***

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ hours per day
_____ minutes per day

22. Think about only those physical activities that you did for at least 10 minutes at a time**.** During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ days per week

○ No vigorous activity in leisure time ➔ ***Skip to question 24***

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ hours per day
_____ minutes per day

10

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ days per week

○ No moderate activity in leisure time ➔ ***Skip to PART 5: TIME SPENT SITTING***

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

_____ hours per day
_____ minutes per day

PART 5: TIME SPENT SITTING

These last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television.
Do not include any time spent sitting in a motor vehicle that you have already told us about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ hours per day
_____ minutes per day

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ hours per day
_____ minutes per day

Now we would like to know about the time you spend at your workplace **on a typical day**.

28. Please estimate the time that you spend **at your workplace** on a typical day.

_____ hours per day
_____ minutes per day

29. Please estimate the time that you spend **sitting at your workplace**, including during meal and snack breaks, on a typical day.

_____ hours per day
_____ minutes per day

30. How many times on a typical day, while at your workplace, do you **interrupt your sitting**? For example, by standing up, walking somewhere, or getting a coffee**.**

_____ times

11

SECTION D

This section is about your health.

1. How tall are you without shoes? ☐☐☐ cm **OR** ☐☐ ft ☐☐ in

2. (Females only) Are you currently pregnant? ○ Yes **(Skip to Q.5)** ○ No

3. How much do you weigh? ☐☐☐ kg **OR** ☐☐ st ☐☐ lb

4. How much would you like to weigh now? (Select only one)

○ Happy as I am	○ 1 – 5 kg less
○ 1 – 5 kg more	○ 6 – 10 kg less
○ Over 5 kg more	○ Over 10 kg less

The following questions ask for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

5. In general, would you say your health is:

○ Excellent ○ Very good ○ Good ○ Fair ○ Poor

6. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

		YES, limited a lot	YES, limited a little	NO, not limited at all
6a)	Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	○	○	○
6b)	Climbing several flights of stairs	○	○	○

7. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

		All of the time	Most of the time	Some of the time	A little of the time	None of the time
7a)	Accomplished less than you would like	○	○	○	○	○
7b)	Were limited in the kind of work or other activities	○	○	○	○	○

12

8. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
8a) Accomplished less than you would like.	○	○	○	○	○
8b) Did work or other activities less carefully than usual	○	○	○	○	○

9. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
○	○	○	○	○

10. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks:	All of the time	Most of the time	Some of the time	A little of the time	None of the time
10a) Have you felt calm and peaceful?	○	○	○	○	○
10b) Did you have a lot of energy?	○	○	○	○	○
10c) Have you felt downhearted and depressed?	○	○	○	○	○

11. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
○	○	○	○	○

12. Do you currently have any of the following conditions?

		Yes	No
a)	Arthritis or rheumatism	○	○
b)	Chronic back pain	○	○
c)	Migraine headaches	○	○
d)	Other frequent or severe headaches	○	○
e)	Any other chronic pain	○	○
f)	High blood pressure or hypertension	○	○
g)	Congestive heart failure	○	○
h)	Coronary heart disease	○	○
i)	High blood cholesterol	○	○
j)	An ulcer in your stomach or intestine	○	○
k)	Irritable bowel disorder	○	○
l)	Chronic heart burn or gastroesophageal reflux disease	○	○
m)	Asthma	○	○
n)	Chronic bronchitis or emphysema	○	○
o)	Seasonal allergies or hay fever	○	○
p)	Chronic Obstructive Pulmonary Disease	○	○
q)	Urinary or bladder problems	○	○
r)	Diabetes	○	○
s)	Obesity	○	○
t)	Chronic sleeping problems	○	○
u)	Chronic fatigue or low energy	○	○
v)	Osteoporosis	○	○
w)	Skin cancer	○	○
x)	Any other type of cancer	○	○

13. How many times in the last 12 months have you been admitted <u>overnight or longer</u> in any hospital for any reason?

☐☐ times

14. In the past 12 months, how many nights <u>in total</u> did you stay in hospital?

☐☐ nights

14

The following ten questions ask about how you have been feeling in the last four weeks. For each question, fill in the circle under the option that best describes the amount of time you felt that way.

		None of the time	A little of the time	Some of the time	Most of the time	All of the time
15.	In the past 4 weeks about how often did you feel tired out for no good reason?	○	○	○	○	○
16.	In the past 4 weeks about how often did you feel nervous?	○	○	○	○	○
17.	In the past 4 weeks about how often did you feel so nervous that nothing could calm you down?	○	○	○	○	○
18.	In the past 4 weeks about how often did you feel hopeless?	○	○	○	○	○
19.	In the past 4 weeks about how often did you feel restless or fidgety?	○	○	○	○	○
20.	In the past 4 weeks about how often did you feel so restless you could not sit still?	○	○	○	○	○
21.	In the past 4 weeks about how often did you feel depressed?	○	○	○	○	○
22.	In the past 4 weeks about how often did you feel that everything was an effort?	○	○	○	○	○
23.	In the past 4 weeks about how often did you feel so sad that nothing could cheer you up?	○	○	○	○	○
24.	In the past 4 weeks about how often did you feel worthless?	○	○	○	○	○

SECTION E

These questions are about your employment in the Tasmanian state service.

1. Do you have more than one paid position in the Tasmanian state service?
○ No **(Skip to Q. 3)**
○ Yes

2. Please specify what your consider to be your main job Agency_____
Job Title _____

Please answer all questions in Section E in relation to your main job in the Tasmanian state service

3. On which days of the week to you usually work?

○ Five days a week Monday to Friday
○ Days vary from week to week
○ Other – please specify days below
○ Monday ○ Tuesday ○ Wednesday ○ Thursday ○ Friday ○ Saturday ○ Sunday

4. Which of the following options best describe your current work schedule? Please choose all that apply

○ A regular daytime schedule
○ A regular night shift
○ Split shift (two distinct periods per day)
○ Irregular schedule
○ A regular evening shift
○ A rotating shift (changes from days to evenings to nights)
○ On call
○ Other – please specify _____

5. How many hours per week do you usually work? Include any paid or unpaid overtime.
This includes any work done at the workplace and at home. Don't include time 'on-call'.

☐☐ hours per week

6. If you could choose the number of hours you work each week, *and taking into account how that would affect your income*, would you prefer to work:
○ Fewer hours than you do now?
○ About the same hours as you do now?
○ More hours than you do now?

7. How many days in the last 4 weeks have you stayed away from your work for more than half the day because of health problems?

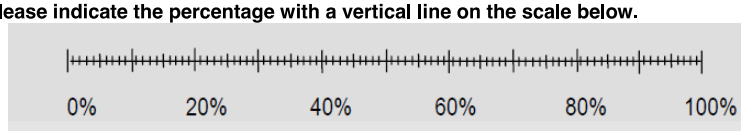
☐☐ days

8. How many days in the last 4 weeks did you go to work while suffering from health problems?

☐☐ days

9. On these days when you went to work suffering from health problems, what percentage of your time were you as productive as usual?
For example, if you were exactly as productive as usual please mark '100 %'.

Please indicate the percentage with a vertical line on the scale below.



16

The following items refer to your <u>main</u> job in the Tasmanian state service. For each of the following statements, please indicate to what degree it reflects your situation.
Thank you for answering <u>all</u> statements!

10. I have constant time pressure due to a heavy work load.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

11. I have many interruptions and disturbances while performing my job.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

12. I have a lot of responsibility in my job.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

13. I am often pressured to work overtime.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

14. My job is physically demanding.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

15. Over the past few years, my job has become more and more demanding.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

16. I receive the respect I deserve from my superiors.

Not applicable (no superiors) ○
Agree ○
Disagree, but I am not at all distressed ○
Disagree, and I am somewhat distressed ○
Disagree, and I am distressed ○
Disagree, and I am very distressed ○

17. I receive the respect I deserve from my colleagues.

Not applicable (no colleagues) ○
Agree ○
Disagree, but I am not at all distressed ○
Disagree, and I am somewhat distressed ○
Disagree, and I am distressed ○
Disagree, and I am very distressed ○

18. I experience adequate support in difficult situations.

Agree ○
Disagree, but I am not at all distressed ○
Disagree, and I am somewhat distressed ○
Disagree, and I am distressed ○
Disagree, and I am very distressed ○

19. I am treated unfairly at work.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

20. My job promotion prospects are poor.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

21. I have experienced or I expect to experience an undesirable change in my work situation.

Disagree ○
Agree, but I am not at all distressed ○
Agree, and I am somewhat distressed ○
Agree, and I am distressed ○
Agree, and I am very distressed ○

18

22. My employment security is poor.

Disagree..... O
Agree, but I am not at all distressed..... O
Agree, and I am somewhat distressed..... O
Agree, and I am distressed..... O
Agree, and I am very distressed..... O

23. My current occupational position adequately reflects my education and training.

Agree..... O
Disagree, but I am not at all distressed..... O
Disagree, and I am somewhat distressed... O
Disagree, and I am distressed..... O
Disagree, and I am very distressed..... O

24. Considering all my efforts and achievements, I receive the respect and prestige I deserve at work.

Agree..... O
Disagree, but I am not at all distressed..... O
Disagree, and I am somewhat distressed... O
Disagree, and I am distressed..... O
Disagree, and I am very distressed..... O

25. Considering all my efforts and achievements, my job promotion prospects are adequate.

Agree..... O
Disagree, but I am not at all distressed..... O
Disagree, and I am somewhat distressed... O
Disagree, and I am distressed..... O
Disagree, and I am very distressed..... O

26. Considering all my efforts and achievements, my salary / income is adequate.

Agree..... O
Disagree, but I am not at all distressed..... O
Disagree, and I am somewhat distressed... O
Disagree, and I am distressed..... O
Disagree, and I am very distressed..... O

The following items are about health activities in <u>your workplace</u> for your main job in the Tasmanian state service.

27. Please indicate the amenities that are available. Choose all that apply.

- ○ Space to hold activities
- ○ Equipment storage areas
- ○ Lunch / break room
- ○ Onsite gymnasium / fitness centre
- ○ Shower and change facilities
- ○ Fruit baskets provided
- ○ Outdoor exercise areas for employees to use
- ○ Stairs / stair wells that can be used for exercise
- ○ Bulletin boards or newsletters where health information is provided
- ○ Healthy food options (e.g work meetings, on-site canteens or vending machines)
- ○ Other (please specify) _____

28. Please indicate which workplace health and wellbeing activities were available in the past 12 months. If "Yes", please indicate the number of times you participated.

		Available in past 12 months		**Number of times you participated in the past 12 months**
		No	Yes	Please enter a number.
a)	Health information seminars or workshops	○	○ →	☐☐
b)	Global Corporate Challenge	○	○ →	☐☐
c)	Organisation sport team / sport or activity days	○	○ →	☐☐
d)	Employee Assistance Program	○	○ →	☐☐
e)	Exercise or physical activity sessions	○	○ →	☐☐
f)	Injury prevention or rehabilitation	○	○ →	☐☐
g)	Allocated stretching or relaxing times	○	○ →	☐☐
h)	Regular health assessments	○	○ →	☐☐
i)	Cycle to work or walk to work activities / TravelSmart Workplace Program	○	○ →	☐☐
j)	Regular fitness assessments	○	○ →	☐☐
k)	Personal development opportunities for life skills	○	○ →	☐☐
l)	Flu vaccination	○	○ →	☐☐
m)	Stress management program or strategies	○	○ →	☐☐
n)	Subsidised membership to off-site facilities/programs	○	○ →	☐☐
o)	'Walk and talk' or active meetings	○	○ →	☐☐
p)	Flexible work arrangements	○	○ →	☐☐
q)	Other (please specify) _____	○	○ →	☐☐

29. In the past 12 months, did you spend any of your own money to take part in any of the above activities?

○ No ○ Yes → Total amount you spent in dollars $☐☐☐

20

THANK&YOU*FOR*TAKING*THE*TIME*TO*COMPLETE*THE*SURVEY*
*
*
PLEASE*POST*THIS*SURVEY*AND*THE*CONSENT*FORM*BACK*TO*US*IN*THE*REPLY*PAID*ENVELOPE*PROVIDED*

Appendix 2. 2013 *partnering*Healthy@Work survey

Menzies Research Institute Tasmania

UTAS

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ID Number: [ ]

partnering HEALTHY@WORK QUESTIONNAIRE

This questionnaire asks for some general information about you, as well as some information about your physical and emotional health, your diet and physical activity, and your employment.

Instructions: Please read carefully

Please answer all questions to the best of your ability (leave blank if unknown).

Your answers will be completely confidential.

To answer most of the questions you only need to cross a box. Please cross the box which is closest to your view—there are no right or wrong answers.

Example:

6 What is the composition of your household?

- [X] 1 Couple family with children
- [ ] 2 Couple family without children
- [ ] 3 One parent family
- [ ] 4 Group household
- [ ] 5 Lone household

If you make a mistake, please colour the error box and then cross the correct one, like this: [■] 1 [X] 2

Some boxes have 'Skip to' instructions that look like this: [X] 1 → Skip to Q12

If you chose an answer with a 'Skip to', please follow this 'Skip to' instruction even if you miss out on some questions.

Sometimes you are asked to write in an answer — in that case, simply write your answer clearly in the space provided.

2 Your date of birth: 2 9 / 1 2 / 8 2 (dd/mm/yy)

Please use BLOCK LETTERS where required.

Please use a black or blue pen if possible.

MISSING FORMAT

BLACK

SECTION A: This section asks you some general questions about yourself.

1 Today's date: ☐☐/☐☐/☐☐ (dd/mm/yy)

2 Your date of birth: ☐☐/☐☐/☐☐ (dd/mm/yy)

3 What is your sex? ☐ 1 Male ☐ 2 Female

4 What is your current marital status?

1 ☐ 1 Single
2 ☐ 2 Married
3 ☐ 3 De facto
4 ☐ 4 Separated / Divorced
5 ☐ 5 Widowed

5 What is the highest level of education you have completed? *(Select only one)*

1 ☐ 1 Primary school
2 ☐ 2 Year 7, 8 or 9 or equivalent
3 ☐ 3 Year 10 or equivalent
4 ☐ 4 Year 12 or equivalent
5 ☐ 5 Trade / apprenticeship *(e.g. hairdresser, chef)*
6 ☐ 6 Certificate / diploma *(e.g. child care, technician)*
7 ☐ 7 University degree
8 ☐ 8 Higher university degree *(e.g. Grad Dip, Masters, PhD)*

6 What is the composition of your household?

1 ☐ 1 Couple family with children
2 ☐ 2 Couple family without children
3 ☐ 3 One parent family
4 ☐ 4 Group household
5 ☐ 5 Lone household

7 a) What would you say is the single most important thing you personally could do to improve your health or reduce your risk of getting sick? Write in the box below.

b) For this change, which one applies to you now?

1 ☐ 1 I am not thinking of making this change
2 ☐ 2 I am thinking about making this change, but not in the next fortnight
3 ☐ 3 I am thinking about making this change in the next fortnight or so
4 ☐ 4 I am trying to make this change at the moment

SECTION B: These questions are about your diet and smoking tobacco.

1 How many serves of vegetables (excluding potatoes) do you usually eat each day?
(One serve = ½ cup cooked vegetables or 1 cup of salad vegetables)

☐ 1 1 serve or less ☐ 2 2 serves ☐ 3 3 serves ☐ 4 4 serves ☐ 5 5 serves
☐ 6 6 or more serves ☐ 7 Don't eat vegetables

2 How many serves of fruit do you usually eat each day?
(One serve = 1 medium piece of fruit or 1 cup of diced pieces)

☐ 1 1 serve or less ☐ 2 2 serves ☐ 3 3 serves ☐ 4 4 or more serves
☐ 5 Don't eat fruit

3 How many times do you eat red meat in an average week, including sausages, luncheon meat, salami, meat pies, hamburger or bacon (but not including fish or poultry)?

☐ 1 Ten or more times per week
☐ 2 Five to nine times a week
☐ 3 Three to four times a week
☐ 4 Once or twice a week
☐ 5 Less than once a week
☐ 6 Never

4 How often do you eat fish or seafood in an average week?

☐ 1 Six or more times a week
☐ 2 Three to five times a week
☐ 3 Once or twice a week
☐ 4 Less than once a week
☐ 5 I never eat fish for medical reasons
☐ 6 I never eat fish for religious or ethical reasons
☐ 7 I never eat fish for other reasons *(please specify)*

5 How many times per week would you usually eat hot takeaway meals? (e.g. pizza, burgers, fried or roast chicken, Chinese / Indian / Thai takeaway)

☐ 1 I don't eat takeaway
☐ 2 1 meal or less per month
☐ 3 1 meal per week
☐ 4 2-3 meals per week
☐ 5 4-5 meals per week
☐ 6 6-7 or more meals per week

BLACK

6 What type of milk do you usually consume?

- 1 ☐ 1 Condensed
- 2 ☐ 2 Full cream (normal milk)
- 3 ☐ 3 Almost equal amounts of full cream and reduced fat
- 4 ☐ 4 Reduced fat
- 5 ☐ 5 Skim
- 6 ☐ 6 None
- 7 ☐ 7 Other *(please specify)*

7 How often do you add salt to your food after it is cooked?

- 1 ☐ 1 Never
- 2 ☐ 2 Rarely
- 3 ☐ 3 Sometimes
- 4 ☐ 4 Almost always
- 5 ☐ 5 Always

8 How many days per week do you usually have something to eat for breakfast?

- 1 ☐ 1 Rarely or never
- 2 ☐ 2 1-2 days
- 3 ☐ 3 3-4 days
- 4 ☐ 4 5 or more days
- 5 ☐ 5 Don't know / varies / depends

9 How often do you have a drink containing alcohol?

- 1 ☐ 1 Never → Skip to Q12
- 2 ☐ 2 Monthly or less
- 3 ☐ 3 2 to 4 times a month
- 4 ☐ 4 2 to 3 times a week
- 5 ☐ 5 4 or more times a week

10 How many standard drinks do you have on a typical day when you are drinking?
(Please refer to the Standard Drink Guide on the next page for examples of standard drinks).

☐ 1 1 or 2 (1) ☐ 2 3 or 4 (2) ☐ 3 5 or 6 (3) ☐ 4 7 to 9 (4) ☐ 5 10 or more (5)

11 How often do you have 5 or more standard drinks on one occasion?

- 1 ☐ 1 Never
- 2 ☐ 2 Less than monthly
- 3 ☐ 3 Monthly
- 4 ☐ 4 Weekly
- 5 ☐ 5 Daily or almost daily

12 Over your lifetime, have you smoked <u>at least 100 cigarettes</u> or a similar amount of tobacco?

☐ 1 Yes → Answer Q13 ☐ 2 No → Skip to Section C

1 2

13 Have you ever been a <u>daily</u> smoker?

☐ 1 Yes ☐ 2 No → Skip to Section C

1 2

a) At what age did you start smoking <u>daily</u>? ☐☐ years

b) How often do you <u>now</u> smoke cigarettes, cigars, pipes or any other tobacco products?

1 ☐ 1 Daily → Skip to Section C
2 ☐ 2 At least weekly (but not daily)
3 ☐ 3 Less often than weekly
4 ☐ 4 Not at all

c) At what age did you finally <u>stop</u> smoking daily? ☐☐ years

SECTION C: These questions are about your current physical activities.

The following questions will ask you about the time you spent being physically active in the last 7 days. Please think about the activities you do at work, as a part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Please answer each question even if you do not consider yourself to be an active person.

Think about **all** the **vigorous** and **moderate** activities that you did in the **last 7 days**.

- **Vigorous** physical activities refer to activities that take **hard** physical effort and make you breathe much harder than normal.
- **Moderate** activities refer to activities that take moderate physical effort and make you breathe **somewhat** harder than normal.

PART 1: WORK-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home.

Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. We ask about these in Part 3.

1 Do you currently have a job or do any unpaid work outside your home?

☐ 1 Yes ☐ 2 No ➔ Skip to PART 2: TRANSPORTATION

The next questions are about all the physical activity you did in the last 7 days as part of your paid or unpaid work. This does not include travelling to and from work.

2 During the **last 7 days**, on how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**?
Think about only those physical activities that you did for **at least 10 minutes** at a time.

☐☐ days per week ☐ No vigorous job-related physical activity ➔ Skip to Q4

3 How much time did you usually spend on one of those days doing vigorous physical activities as part of your work?

☐☐ hours per day ☐☐ minutes per day

4 Again, think about only those physical activities that you did for **at least 10 minutes** at a time.
During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads as part of your work? *Please DO NOT include walking.*

☐☐ days per week ☐ No moderate job-related physical activity ➔ **Skip to Q6**

BLACK

5 How much time did you **usually** spend on one of those **days** doing **moderate** physical activities as part of your work?

☐☐ hours per day ☐☐ minutes per day

6 During the last 7 **days**, on how many **days** did you walk **for at least 10 minutes** at a time as part of your work? **Please** do not count any walking you did to travel to or from work.

☐ days per week ☐ No job-related walking ➔ Skip to PART 2: TRANSPORTATION

7 How much time did you usually spend on **one** of those **days walking** as part of your work?

☐☐ hours per day ☐☐ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you travelled from place to place, including to places like work, stores, movies, and so on.

8 During the last 7 **days**, on how many **days** did you travel **in a motor vehicle** like a train, bus, car, or tram?

☐ days per week ☐ No travelling in a motor vehicle ➔ Skip to Q10

9 How much time did you **usually** spend in a motor vehicle on **one** of those days?

☐☐ hours per day ☐☐ minutes per day

Now think only about the <u>cycling</u> and <u>walking</u> you might have done to travel to and from work, to do errands, or to go from place to place.

10 During **the last 7 days**, on how many days did you **cycle** for **at least 10 minutes** at a time to go from place to **place**?

☐ days per week ☐ No bicycling from place to place ➔ Skip to Q12

11 How much time did you usually spend on **one** of those **days cycling** from place to place?

☐☐ hours per day ☐☐ minutes per day

12 During the last 7 days, on how many days did you **walk** for **at least 10 minutes** at a time to go from place to place?

☐ days per week ☐ No walking from place to place → Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

13 How much time did you usually spend on **one** of those days **walking** from place to place?

☐☐ hours per day ☐☐ minutes per day

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

YARD WORK:

14 Think about only those physical activities that you did for at **least 10 minutes** at a time. During **the last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, or digging in the garden or yard?

☐ days per week ☐ No vigorous activity in garden or yard → Skip to Q16

15 How much time did you usually spend on **one** of those days doing **vigorous** physical activities **in the garden or yard**?

☐☐ hours per day ☐☐ minutes per day

16 Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

☐ days per week ☐ No moderate activity in garden or yard → Skip to Q18

17 How much time did you usually spend on one of those days doing **moderate** physical activities **in the garden or yard**?

☐☐ hours per day ☐☐ minutes per day

HOUSEWORK:

18 Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

☐☐ days per week ☐ No moderate activity inside home → Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY

19 How much time did you usually spend on one of those days doing **moderate** physical activities **inside your home**?

☐☐ hours per day ☐☐ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20 Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

☐☐ days per week ☐ No walking in leisure time → Skip to Q22

21 How much time did you usually spend on one of those days **walking** in your leisure time?

☐☐ hours per day ☐☐ minutes per day

22 Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

☐☐ days per week ☐ No vigorous activity in leisure time → Skip to Q24

23 How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

☐☐ hours per day ☐☐ minutes per day

BLACK

24 Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

☐☐ days per week ☐ No moderate activity in leisure time → Skip to PART 5: TIME SPENT SITTING

25 How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

☐☐ hours per day ☐☐ minutes per day

PART 5: TIME SPENT SITTING

These last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television.

Do not include any time spent sitting in a motor vehicle that you have already told us about.

26 During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

☐☐ hours per day ☐☐ minutes per day

27 During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

☐☐ hours per day ☐☐ minutes per day

Now we would like to know about the time you spend at your workplace **on a typical day**.

28 Please estimate the time that you spend **at your workplace** on a typical day.

☐☐ hours per day ☐☐ minutes per day

29 Please estimate the time that you spend **sitting at your workplace**, including during meal and snack breaks, on a typical day.

☐☐ hours per day ☐☐ minutes per day

30 How many times on a typical day, while at your workplace, do you **interrupt your sitting**? For example, by standing up, walking somewhere, or getting a coffee.

☐☐ times

SECTION D: This section is about your health.

1 How tall are you without shoes? ☐☐☐ cm **OR** ☐☐ ft ☐☐ in

2 (Females only) Are you currently pregnant? ☐ 1 Yes → Skip to Q5 ☐ 2 No
1

3 How much do you weigh? ☐☐☐ kg **OR** ☐☐ st ☐☐ lb

4 How much would you like to weigh now? (Select *only one*)

1 ☐ 1 Happy as I am
2 ☐ 2 1 – 5 kg more
3 ☐ 3 Over 5 kg more
4 ☐ 4 1 – 5 kg less
5 ☐ 5 6 – 10 kg less
6 ☐ 6 Over 10 kg less

The following questions ask for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

5 In general, would you say your health is:

☐ 1 Excellent ☐ 2 Very good ☐ 3 Good ☐ 4 Fair ☐ 5 Poor
1 2 3 4 5

6 The following questions are about activities you might do during a typical day. Does your health **now limit you** in these activities? If so, how much?

	YES, limited a lot	YES, limited a little	NO, not limited at all
a) Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	☐ 1 1	☐ 2 2	☐ 3 3
b) Climbing several flights of stairs	☐ 1 1	☐ 2 2	☐ 3 3

7 During the **past 4 weeks**, how much of the time have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Accomplished less than you would like	☐ 1 1	☐ 2 2	☐ 3 3	☐ 4 4	☐ 5 5
b) Were limited in the kind of work or other activities	☐ 1 1	☐ 2 2	☐ 3 3	☐ 4 4	☐ 5 5

BLACK

8 During **the past 4 weeks**, how much of the time have you had any of the following problems with your work or other regular daily activities **as a result of any emotional problems** (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Accomplished less than you would like	☐1 1	☐2 2	☐3 3	☐4 4	☐5 5
b) Did work or other activities less carefully than usual	☐1 1	☐2 2	☐3 3	☐4 4	☐5 5

9 During the **past 4 weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
☐1 1	☐2 2	☐3 3	☐4 4	☐5 5

10 These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks:	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Have you felt calm and peaceful?	☐1 1	☐2 2	☐3 3	☐4 4	☐5 5
b) Did you have a lot of energy?	☐1	☐2 2	☐3 3	☐4 4	☐5 5
c) Have you felt downhearted and depressed?	1 ☐1 1	2 ☐2 2	3 ☐3 3	4 ☐4 4	5 ☐5 5

11 During the **past 4 weeks**, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
☐1 1	☐2 2	☐3 3	☐4 4	☐5 5

BLACK

12 Do you currently have any of the following conditions? (12 a)-x)

		Yes	No
a)	Arthritis or rheumatism	☐ 1	☐ 2
b)	Chronic back pain	☐ 1	☐ 2
c)	Migraine headaches	☐ 1	☐ 2
d)	Other frequent or severe headaches	☐ 1	☐ 2
e)	Any other chronic pain	☐ 1	☐ 2
f)	High blood pressure or hypertension	☐ 1	☐ 2
g)	Congestive heart failure	☐ 1	☐ 2
h)	Coronary heart disease	☐ 1	☐ 2
i)	High blood cholesterol	☐ 1	☐ 2
j)	An ulcer in your stomach or intestine	☐ 1	☐ 2
k)	Irritable bowel disorder	☐ 1	☐ 2
l)	Chronic heart burn or gastroesophageal reflux disease	☐ 1	☐ 2
m)	Asthma	☐ 1	☐ 2
n)	Chronic bronchitis or emphysema	☐ 1	☐ 2
o)	Seasonal allergies or hay fever	☐ 1	☐ 2
p)	Chronic Obstructive Pulmonary Disease	☐ 1	☐ 2
q)	Urinary or bladder problems	☐ 1	☐ 2
r)	Diabetes	☐ 1	☐ 2
s)	Obesity	☐ 1	☐ 2
t)	Chronic sleeping problems	☐ 1	☐ 2
u)	Chronic fatigue or low energy	☐ 1	☐ 2
v)	Osteoporosis	☐ 1	☐ 2
w)	Skin cancer	☐ 1	☐ 2
x)	Any other type of cancer	☐ 1	☐ 2

13 How many times in the last 12 months have you been admitted overnight or longer in any hospital for any reason?

☐☐ times

a) (Females only) How many of these times were for pregnancy or child birth?

☐☐ times

14 In the past 12 months, how many nights **in total** did you stay in hospital?

☐☐ nights

a) (Females only) How many of these nights were due to pregnancy or child birth?

☐☐ nights

BLACK

The following ten questions ask about how you have been feeling in the last four weeks. For each question, cross the box under the option that best describes the amount of time you felt that way.

Q15-24

		1 None of the time	2 A little of the time	3 Some of the time	4 Most of the time	5 All of the time
15	In the past 4 weeks about how often did you feel tired out for no good reason?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
16	In the past 4 weeks about how often did you feel nervous?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
17	In the past 4 weeks about how often did you feel so nervous that nothing could calm you down?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
18	In the past 4 weeks about how often did you feel hopeless?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
19	In the past 4 weeks about how often did you feel restless or fidgety?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
20	In the past 4 weeks about how often did you feel so restless you could not sit still?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
21	In the past 4 weeks about how often did you feel depressed?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
22	In the past 4 weeks about how often did you feel that everything was an effort?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
23	In the past 4 weeks about how often did you feel so sad that nothing could cheer you up?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
24	In the past 4 weeks about how often did you feel worthless?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

SECTION E: These questions are about your employment in the Tasmanian State Service.

1 Do you have **more than one** paid position in the Tasmanian State Service?

☐ 1 No → Skip to Q3 ☐ 2 Yes

2 Please specify what you consider to be your main job

Agency _____

Job Title _____

Please answer all questions in Section E in relation to your main job in the Tasmanian State Service.

3 On which days of the week do you **usually** work?

1 ☐ 1 Five days a week Monday to Friday
2 ☐ 2 Days vary from week to week
3 ☐ 3 Other – please specify days below
1 ☐ 1 Monday 2 ☐ 2 Tuesday 3 ☐ 3 Wednesday 4 ☐ 4 Thursday 5 ☐ 5 Friday
6 ☐ 6 Saturday 7 ☐ 7 Sunday

4 Which of the following options best describe your current work schedule?
(Please choose all that apply)

Separate variables
Ticked = Yes = 1
Not ticked = No = 0

☐ A regular daytime schedule
☐ A regular night shift
☐ Split shift (two distinct periods per day)
☐ Irregular schedule
☐ A regular evening shift
☐ A rotating shift (changes from days to evenings to nights)
☐ On call
☐ Other *(please specify)* _____

5 How many hours per week do you **usually** work? Include any paid or unpaid overtime.
This includes any work done at the workplace and at home. Don't include time 'on-call'.

☐☐ hours per week

6 If you could choose the number of hours you work each week, *and taking into account how that would affect your income*, would you prefer to work:

1 ☐ 1 Fewer hours than you do now?
2 ☐ 2 About the same hours as you do now?
3 ☐ 3 More hours than you do now?

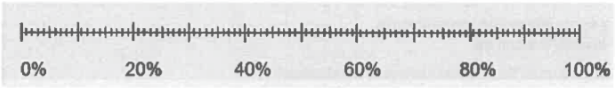
7 How many days in the last 4 weeks have you **stayed away from your work** for more than half the day because of health problems?

☐☐ days

8 How many days in the last 4 weeks did you **go to work while suffering from health problems**?

☐☐ days

9 On these days when you went to work suffering from health problems, what percentage of your time were you as productive as usual?
For example, if you were exactly as productive as usual please mark '100 %'.
Please indicate the percentage with a vertical line on the scale below.



Please advise if Q9 needs to change the format to text instead of indicated a line on the scale

BLACK

The following items refer to your main job in the Tasmanian State Service. For each of the following statements, please indicate to what degree it reflects your situation.
Thank you for answering all statements!

		Disagree	Agree, but I am not at all distressed	Agree, and I am somewhat distressed	Agree, and I am distressed	Agree, and I am very distressed
	Q10-15	1	2	3	4	5
10	I have constant time pressure due to a heavy work load.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
11	I have many interruptions and disturbances while performing my job.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
12	I have a lot of responsibility in my job.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
13	I am often pressured to work overtime.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
14	My job is physically demanding.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
15	Over the past few years, my job has become more and more demanding.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

		Not applicable	Agree	Disagree, but I am not at all distressed	Disagree, and I am somewhat distressed	Disagree, and I am distressed	Disagree, and I am very distressed
16	I receive the respect I deserve from my superiors.	☐ 1 0	☐ 2 1	☐ 3 2	☐ 4 3	☐ 5 4	☐ 6 5
17	I receive the respect I deserve from my colleagues.	☐ 1 0	☐ 2 1	☐ 3 2	☐ 4 3	☐ 5 4	☐ 6 5
18	I experience adequate support in difficult situations.		☐ 2 1	☐ 3 2	☐ 4 3	☐ 5 4	☐ 6 5

		Disagree	Agree, but I am not at all distressed	Agree, and I am somewhat distressed	Agree, and I am distressed	Agree, and I am very distressed
	Q19-22	1	2	3	4	5
19	I am treated unfairly at work.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
20	My job promotion prospects are poor.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
21	I have experienced or I expect to experience an undesirable change in my work situation.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
22	My employment security is poor.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

		Agree	Disagree, but I am not at all distressed	Disagree, and I am somewhat distressed	Disagree, and I am distressed	Disagree, and I am very distressed
	Q23-26	1	2	3	4	5
23	My current occupational position adequately reflects my education and training.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
24	Considering all my efforts and achievements, I receive the respect and prestige I deserve at work.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
25	Considering all my efforts and achievements, my job promotion prospects are adequate.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
26	Considering all my efforts and achievements, my salary / income is adequate.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

How far do you agree or disagree with the following statements?

	Q27-31	1 Strongly agree	2 Agree	3 Disagree	4 Strongly Disagree	5 Don't know
27	I feel proud when I tell others I am part of my organisation	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
28	I would recommend my organisation as a great place to work	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
29	I feel a strong personal attachment to my organisation	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
30	My organisation inspires me to do the best in my job	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
31	My organisation motivates me to help it achieve its objectives	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

BLACK

The following items are about health activities in <u>your workplace</u> for your main job in the Tasmanian State Service.

32 Please indicate the amenities / supports that are available. *(Choose all that apply)*

Ticked = Yes = 1
Not ticked = No = 0

- ☐ 1 Space to hold activities
- ☐ 2 Equipment storage areas
- ☐ 3 Lunch / break room
- ☐ 4 Onsite gymnasium / fitness centre
- ☐ 5 Bicycle racks / storage
- ☐ 6 Healthy vending machine options
- ☐ 7 Workplace Wellness Health Champions
- ☐ 8 Bulletin boards, newsletters, emails or websites where health information is provided
- ☐ 9 Shower and change facilities
- ☐ 10 Fruit baskets provided
- ☐ 11 Outdoor exercise areas for employees to use
- ☐ 12 Stairs / stair wells that can be used for exercise
- ☐ 13 Healthy food options (e.g. work meetings, on-site canteens)
- ☐ 14 Drinking water
- ☐ 15 Flexible work arrangements
- ☐ 16 Other *(please specify)*

BLACK

33 Please indicate which workplace health and wellbeing activities were available in the past 3 years. If 'yes', please indicate the number of times you participated.

Type of health and wellbeing activities available (33a)–i)	Available in the past 3 years: No (0)	Available in the past 3 years: Yes (1)	Number of times you participated in the past 3 years: If yes, please enter a number
a) **Education** e.g. Health information seminars or workshops	☐1	☐2	☐☐☐
b) **Health assessments** e.g. Health checks (BUPA/MBF health lounges), regular health assessments, regular fitness assessments, pre-employment health screening	☐1	☐2	☐☐☐
c) **Physical activity** e.g Global Corporate Challenge, Hydra-Walk, organisation sport team, sport or activity days, exercise or physical activity sessions (e.g. yoga, fit-ball, boot camp), active transport (e.g. TravelSmart Workplace Program, cycle to work or walk to work)	☐1	☐2	☐☐☐
d) **Smoking** e.g Smoking cessation programs (e.g. nicotine replacement, counselling)	☐1	☐2	☐☐☐
e) **Mental health and wellbeing** e.g Employee Assistance Programs, stress-management program or strategies, allocated stretching or relaxing times, massage, personal development opportunities for life skills, training or activities for mental health and wellbeing (e.g. Mental Health First Aid, Mindfulness, Flourishing People Happiness Training, *beyondblue*)	☐1	☐2	☐☐☐
f) **Interrupted sitting** e.g. Exertime, Project Pause, standing work station	☐1	☐2	☐☐☐
g) **'Walk and talk' or active meetings**	☐1	☐2	☐☐☐
h) **Flu vaccination**	☐1	☐2	☐☐☐
i) **Injury prevention / rehabilitation**	☐1	☐2	☐☐☐
j) **Subsidised membership to off-site facilities or programs**	☐1	☐2	☐☐☐
k) **Regular health and wellbeing activities facilitated by the organization** e.g walking / cycling groups	☐1	☐2	☐☐☐
l) **Other** *(Please specify)* ☐	☐1	☐2	☐☐☐

If you did not participate in any of the above activities, skip to Q35.

BLACK

34 Did the workplace health and wellbeing activities listed in question 33 -

34 a) – e)

	Yes	No	Not sure
a) Help you to -	1	0	2
Improve your health	☐ 1	☐ 2	☐ 3
Be more physically active	☐ 1	☐ 2	☐ 3
Quit smoking	☐ 1	☐ 2	☐ 3
Eat more healthily	☐ 1	☐ 2	☐ 3
Drink less alcohol	☐ 1	☐ 2	☐ 3
Lose weight	☐ 1	☐ 2	☐ 3
Reduce stress	☐ 1	☐ 2	☐ 3
Improve your performance at work	☐ 1	☐ 2	☐ 3
b) Give you the opportunity to -			
Be physically active	☐ 1	☐ 2	☐ 3
Eat more healthily	☐ 1	☐ 2	☐ 3
c) Make you motivated to -			
Be physically active	☐ 1	☐ 2	☐ 3
Quit smoking	☐ 1	☐ 2	☐ 3
Eat more healthily	☐ 1	☐ 2	☐ 3
Drink less alcohol	☐ 1	☐ 2	☐ 3
d) Make it more affordable to -			
Be physically active	☐ 1	☐ 2	☐ 3
Eat more healthily	☐ 1	☐ 2	☐ 3
e) Change the way you feel about -			
Your health	☐ 1	☐ 2	☐ 3
Being physically active	☐ 1	☐ 2	☐ 3
Quitting smoking	☐ 1	☐ 2	☐ 3
Eating more healthily	☐ 1	☐ 2	☐ 3
Drinking alcohol	☐ 1	☐ 2	☐ 3
Your job	☐ 1	☐ 2	☐ 3

35 a) Please indicate how you feel about the following statements, even if you *did not* take part in any of the activities or programs listed in question 33.

All 35 a)

	1 Strongly agree	2 Agree	3 Disagree	4 Strongly Disagree
I was consulted in the design of the activities	☐ 1	☐ 2	☐ 3	☐ 4
I have the support of my managers to take part	☐ 1	☐ 2	☐ 3	☐ 4
My organisation places a high priority on these activities	☐ 1	☐ 2	☐ 3	☐ 4
My co-workers were interested in taking part	☐ 1	☐ 2	☐ 3	☐ 4
The activities offered can improve my health and wellbeing	☐ 1	☐ 2	☐ 3	☐ 4

All 35b)

35 b) In general, the activities were:	1 Strongly agree	2 Agree	3 Disagree	4 Strongly Disagree
Well publicised	☐ 1	☐ 2	☐ 3	☐ 4
Interesting to me	☐ 1	☐ 2	☐ 3	☐ 4
Relevant to my needs	☐ 1	☐ 2	☐ 3	☐ 4
Convenient to participate in	☐ 1	☐ 2	☐ 3	☐ 4
Helpful	☐ 1	☐ 2	☐ 3	☐ 4

36 Has anything prevented you from participating in the health and wellbeing activities offered through your workplace?

☐ 1 No ☐ 2 Yes

If yes, what? _____

37 Please indicate how you feel about the following statements even if you *did not* participate in any of the activities or programs listed in question 33.

All 37

	1 Strongly agree	2 Agree	3 Disagree	4 Strongly Disagree
I am already doing enough outside of work to maintain my health and wellbeing	☐ 1	☐ 2	☐ 3	☐ 4
Problems with my health prevent me from participating	☐ 1	☐ 2	☐ 3	☐ 4
My health is not the responsibility of my employer	☐ 1	☐ 2	☐ 3	☐ 4
I have trouble fitting these activities around my family / other commitments	☐ 1	☐ 2	☐ 3	☐ 4
There were no activities or programs available to me	☐ 1	☐ 2	☐ 3	☐ 4
I am too busy at work to have time to participate	☐ 1	☐ 2	☐ 3	☐ 4

38 In the past 3 years, did you spend any of your own money to take part in any of the workplace activities listed in question 33?

☐ 1 No ☐ 2 Yes → Total amount you spent in dollars $ ☐☐☐

THANK YOU FOR TAKING THE TIME TO COMPLETE THE SURVEY
PLEASE RETURN THE SURVEY IN THE REPLY PAID ENVELOPE PROVIDED

Bar code

ID NUMBER: _____

SUPPLEMENTARY QUESTIONS

These questions will help us learn how we can best measure important features of workplace health and wellbeing

You are part of a small, randomly selected group of people to receive the following brief questions. We would be grateful to you for completing the items, however your participation is entirely voluntary.

1. Occupational sitting and physical activity questionnaire (OSPAQ)

These questions are about your typical levels of physical activity and sitting over the last 7 days.

1. How many hours did you work in the last 7 days? _____ hours
2. During the last 7 days, how many days were you at work? _____ days
3. How would you describe your typical work day in the last 7 days? (This involves only your work day, and does not include travel to and from work, or what you did in your leisure time)

   a. Sitting (including driving) _____%
   b. Standing _____%
   c. Walking _____%
   d. Heavy labour or physically demanding tasks _____%

   Total _____% (This must add up to 100%)